



PowerMAN Power Manager 5.3

Client Software Installation and Administration Guide

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About Data Synergy



Data Synergy is a British company based in Sheffield. We have over fifteen years' experience developing and supporting software solutions for enterprise PC deployment and management. We do not resell other vendors' products and do all our development, sales and support from our UK base.

Our products have evolved through listening to customer ideas and applying our unrivalled knowledge of PC internals. If you have a suggestion for a new product or feature we would love to talk to you.

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PowerMAN Overview



Data Synergy PowerMAN Power Manager is an advanced software product giving organisations of all sizes a simple and effective solution to manage PC running costs. PowerMAN complements the built-in power management features of Microsoft Windows® by providing:

- **Comprehensive, centralised, configuration of PC power management**
- **Web-based, organisation-wide reporting of PC usage and costs**

PowerMAN's innovative approach allows PC power features to be simply and centrally managed using familiar Windows tools. This dramatically reduces implementation time and delivers rapid results. PowerMAN's unique web-reporting system allows both IT and non-IT staff to monitor progress and identify areas for improvement.

The PowerMAN software is lightweight and scales very well. The client software (power policy implementation) is configured using standard registry based settings or Windows Group Policy. This does not normally require any additional server resources and will scale to the largest Windows based networks with ease. The PowerMAN reporting (server) software is only used for reporting and can handle > 50,000 computers on a single server. PowerMAN imposes minimal network bandwidth requirements and is designed to work alongside exist proxy and firewall systems. Typically, the standard power reporting feature generates less than 500 bytes of network traffic per day and the optional live reporting feature 2-4 KB/day depending upon activity.

This document explains how to install and configure PowerMAN Power Manager. This document is intended for a system / network administrator.

PowerMAN and PowerMON Products

PowerMAN software is distributed in two forms - **PowerMAN** and **PowerMON**.

The full software product is known as PowerMAN. This allows power management policies to be applied and power usage information to be monitored. PowerMON is a limited feature version of the same software that is used only for power monitoring. The same executable is used for both products. The term PowerMAN is generally used in the documentation. The supplied license key and ADM/ADMX files are different. Some sections in this document refer to features only available in PowerMAN.

New in PowerMAN v5.3

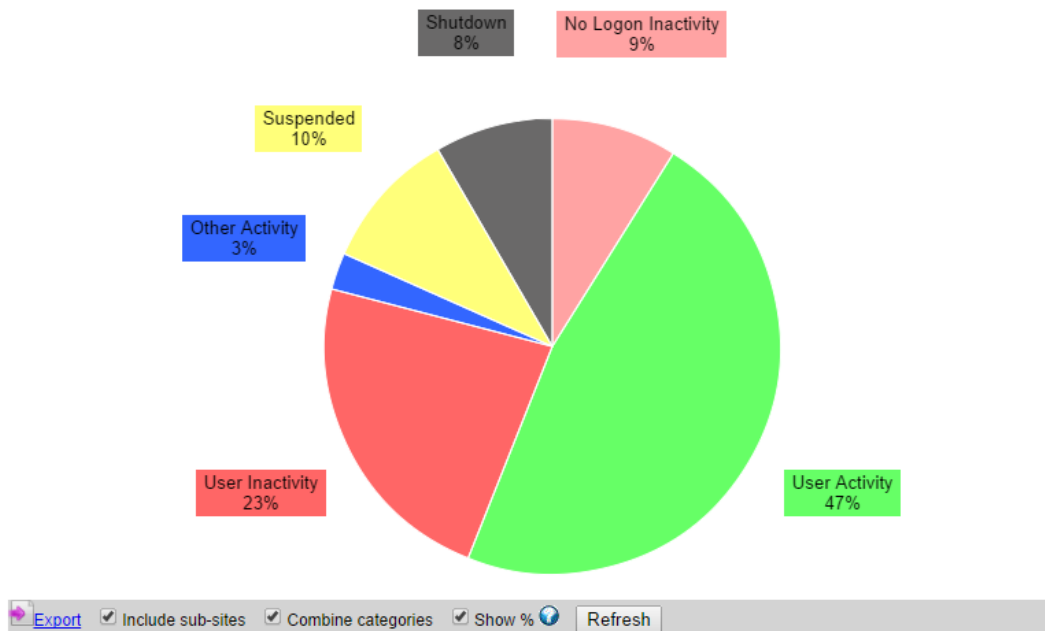
The PowerMAN v5.3 release includes several significant new features. Some of these are available immediately upon installation whilst report related features also require PowerMAN Enterprise Server (PMES) v5.3 to be available. This release of PowerMAN is fully backwards compatible with previous releases of PMES. The following new features are present:

1. PowerMAN now supports **Live Reporting** when used with PMES v5.3. This shows the current workstation status across the selected reporting site and optionally all sub-sites. This feature requires minimal additional network bandwidth to provide an instant understanding of the current operational situation. It is ideal for display on departmental dashboards or similar.

Note: Live reporting requires a new client product key. This is available free-of-charge to PowerMAN customers with current software assurance agreements.

University of New Town Live Statistics

Live Activity Breakdown



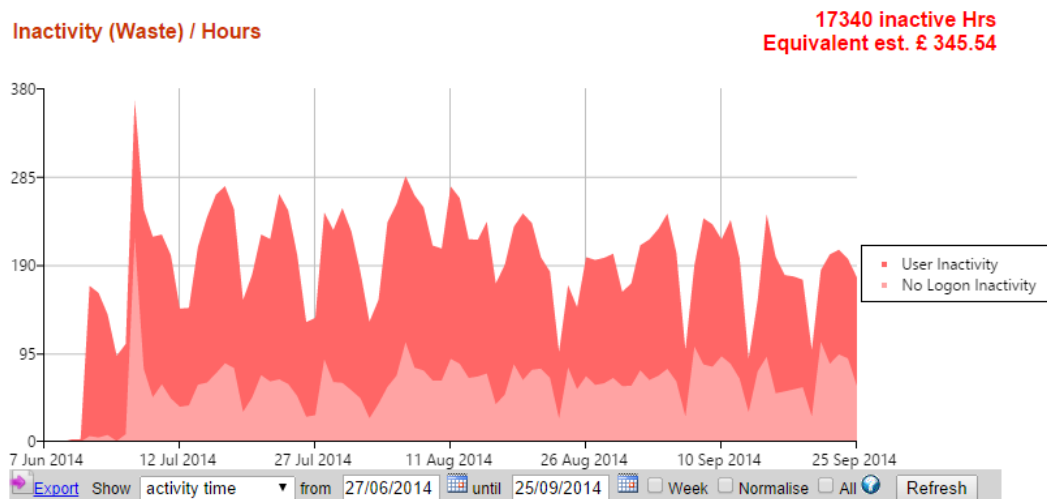
2. PowerMAN now incorporates **Availability Reporting** when used with PMES v5.3. This report shows workstations that are available for use and those already in use broken down by reporting site. This feature is intended for use on operational dashboards and organisation intranets:

Sub-Site Computer Availability

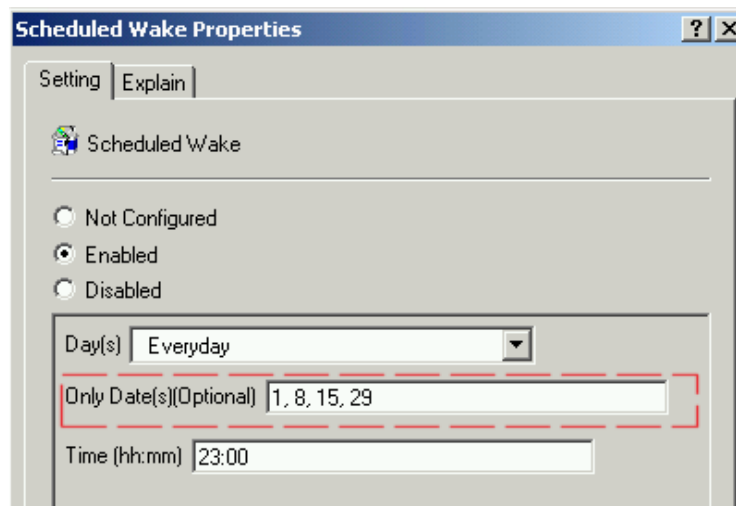
| Site | Available | Not Available | Available |
|--------------------------------------|-----------|---|--|
| 24/8 Computer Lab | 12/60 | <div style="width: 80%; background-color: red;"></div> | <div style="width: 20%; background-color: green;"></div> |
| Daytime Computer Lab | 12/49 | <div style="width: 90%; background-color: red;"></div> | <div style="width: 10%; background-color: green;"></div> |
| East Campus Library | 13/25 | <div style="width: 52%; background-color: red;"></div> | <div style="width: 48%; background-color: green;"></div> |
| Kiosk Terminals | 0/1 | <div style="width: 100%; background-color: red;"></div> | <div style="width: 0%; background-color: green;"></div> |
| West Campus Library | 16/56 | <div style="width: 71%; background-color: red;"></div> | <div style="width: 29%; background-color: green;"></div> |

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- The PMES v5.3 reporting engine has been updated to provide **more granular information**. In particular reports now distinguish between workstations that are idle because no user is logged on and workstations that are idle but logged on. This information can be extremely useful when designing a suitable remedial power policy. The PowerMAN client “No User” policy can be used to specifically target this scenario:



- PowerMAN now supports a **Protected Users** feature. This allows exceptions to the power management policy to be centrally configured on a per-user basis. This complements the Protected Workstation feature that was introduced in release v5.2.8.
- PowerMAN scheduled policies (sleep, shutdown, reboot and wake-up) may now optionally be configured to only apply on **specific days of the month**:






- PowerMAN may now optionally collect workstation hardware information. This may be useful when auditing an existing estate of workstations. This feature requires PowerMAN Server v5.3 or later and is enabled by default unless the computer identity is hidden. Information reported includes:
 - Number of CPU sockets / cores / logical processors
 - Estimated CPU speed (MHz)
 - CPU make / model

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- d. Installed RAM
- e. Motherboard make / model
- f. BIOS make / version / release date
- g. Number of hard / optical disks

For instance:

Data Synergy UK / ENGAGE

| | | | |
|---|---------------------------------|--|--|
| Site | Data Synergy UK | | |
| Computer | ENGAGE | | |
| Created | 04/06/2013 | MAC Address | 00-90-F5-A7-EF-EF |
| Last Status | 05/05/2014 | Client Version | 5.2.8.5829 |
| Supports States  | S345 | Windows® Version | 6.1.7601 Service Pack 1 |
| Supports Wake  | S123 | Timezone  | 1.0 hour(s) UTC |
| Disk Standby | Supported | Hardware buttons | Power Sleep Lid |
| System HDD Free | 50,963 MB | Hibernation File (S4) | Present |
| Battery | Battery supported (Portable) | Platform | x64 (64-bit) |
| CPU Sockets/Cores/Logical | 1 / 2 / 4 2261 MHz | CPU Model | Intel(R) Core(TM) i3 CPU M 350 @ 2.27GHz |
| System RAM | 3892 MB | System Model / Vendor | W760 / CLEVO Co. |
| Fixed / Optical Drives | 1 / 0 | BIOS Vendor | Phoenix Technologies LTD |

7. The PowerMAN client has been improved to support:
 - a. Ignore phantom (optical) mouse input when no user logged on
 - b. Refresh user desktop upon resume

8. The PowerMAN user interface has been extended with the following new optional features:
 - Opt-out and keep-awake selection may be discarded on logout or reboot
 - Notification of recent power events via the UI tray icon may now be disabled
 - Exit menu option may be disabled

These changes are designed to increase power management compliance by avoiding unnecessary user distractions and discourage long-term abuse of the UI features.

9. The PowerMAN client now supports both Spanish and Italian language UI display.

PowerMAN Basics

PowerMAN offers many power management and reporting features. This section explains the key features and terminology used throughout the rest of this document:

Advantages over Windows built-in power management – Why PowerMAN?

Microsoft Windows includes a basic, built-in, power management system. This can be used to configure the computer to enter a low-power mode after a period of time. This feature has evolved with each version of Windows but remains limited. PowerMAN adds several important extensions:

- Central configuration of all power management features
- Multiple policies per user or computer
- Specific policy when nobody is logged on
- Multiple scheduled sleep, hibernate, shutdown or wake-up policies
- Option to logout or shutdown on idle
- Powerful, enterprise-wide, power management reporting

PowerMAN's unique benefit is that it places all of these features in one place and allows them to be used in any appropriate combination. This allows effective power management strategies to be created for every organisation that meet user requirements and maximize energy saving. The inclusion of a built-in reporting suite means that progress can be monitored and policies fine-tuned as necessary.

Low power modes - Shutdown, Hibernate and Sleep (S1-S5)

Modern PCs can offer several different power-saving modes. The PowerMAN site reporting tool can be used to find which states are available on each PC. Not all modes are available on all systems and each has some advantages:


- **Shutdown (Power Off)** – The most efficient (and extreme!) method of power saving. This is generally not appropriate for situations where a user is logged on as it will result in loss of the user's session. Some environments, such as shared access areas, may invoke a complete shutdown after sufficient warning to deter users from leaving computers on and unattended
- **Hibernate (S4)** – This consumes the same amount of power as shutdown but allows the user session to be restored with a short delay (usually about 30 seconds). This is appropriate for computers that are used long term by the same user and where it would be inconvenient to shut down the PC. Typically this policy would be used in an office environment.
- **Sleep (S1-S3)** – This consumes slightly more power than hibernate but allows the user to become productive again after only few seconds delay. Typically a PC in this state requires less than 5% of the operating energy. Three different sleep modes (S1-S3) are available. Each offers increased levels of energy saving. In most cases the available options may be changed by using the appropriate BIOS setting.

In order of decreasing energy consumption the available states are as follows:

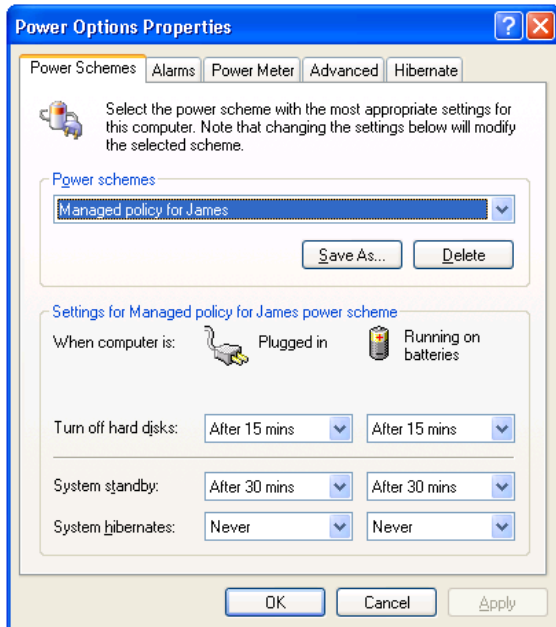
| | |
|----------------------------------|---|
| S1 Sleep (Smaller saving) | System appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode. To maintain the user's session the power supply must remain connected. |
| S2 Sleep | System appears off. The CPU has no power; RAM is refreshed; |

| | |
|--|--|
| | the system is in a lower power mode than S1. To maintain the user's session the power supply must remain connected. |
| S3 Suspend (Bigger saving) | System appears off. The CPU has no power; RAM is in slow refresh; the power supply is in a reduced power mode. This mode is also referred to as 'Save To RAM'. To maintain the user's session the power supply must remain connected. |
| S4 (Hibernate) (Biggest saving) | System is off. The CPU and RAM have no power. This mode is also referred to as 'Save to Disk'. The power supply may be disconnected without any loss to the user's session. |
| S5 (Shutdown) | System is off. There is no user session. NB: A system in the shutdown state may still consume some energy if connected to the mains supply. In most systems there is no measurable difference in power consumption between hibernate and shutdown. In some cases support for Wake-on-LAN can slightly increase S4 power consumption. |

The hibernate and sleep low-power modes **do not log out the current user**. This can result in the next user being unable to logon as the workstation is locked by the previous user. Therefore these methods are not appropriate for systems in public access areas unless combined with an enforced user logout policy. PowerMAN will use the most energy efficient state supported by the hardware. S3 is more efficient than S1

| | | |
|---|-------------------------------------|---|
|  | <p>DMCMOS32.EXE Application</p> | <p>Data Synergy also supplies an enterprise tool for deploying BIOS settings. If you require this utility to quickly deploy hardware settings to multiple computers please contact your sales representative.</p> |
|---|-------------------------------------|---|

Idle-based power management versus scheduled power management



PowerMAN allows power management actions to be triggered in two different ways:

- When the system is **idle**
- At a specific **scheduled time**

Basic idle based power management is available from the Windows Control Panel. This can be used to configure the computer to enter a low-power state (sleep or hibernate) after a pre-set period of idleness.

PowerMAN extends this to provide different policies for different users, times of the time and additional idle actions (shutdown and reboot).

The computer is idle when no user activity occurs (keyboard or mouse activity) for a pre-set time and no important programs are running.



Scheduled power management allows the system to enter a low-power state or resume to a working state at a pre-set time.

Idle and scheduled can both be useful. Some organisations select an idle driven approach whilst others are more comfortable with a scheduled system.

Remember: Idle-based approaches generally offer greater energy savings because they allow each computer to respond dynamically to its usage environment. Scheduled approaches are more appropriate for environments with a rigid and predictable operating pattern. A timetabled school classroom is a common example.

In some cases it may be beneficial to use a mixture of approaches. PowerMAN fully supports this.

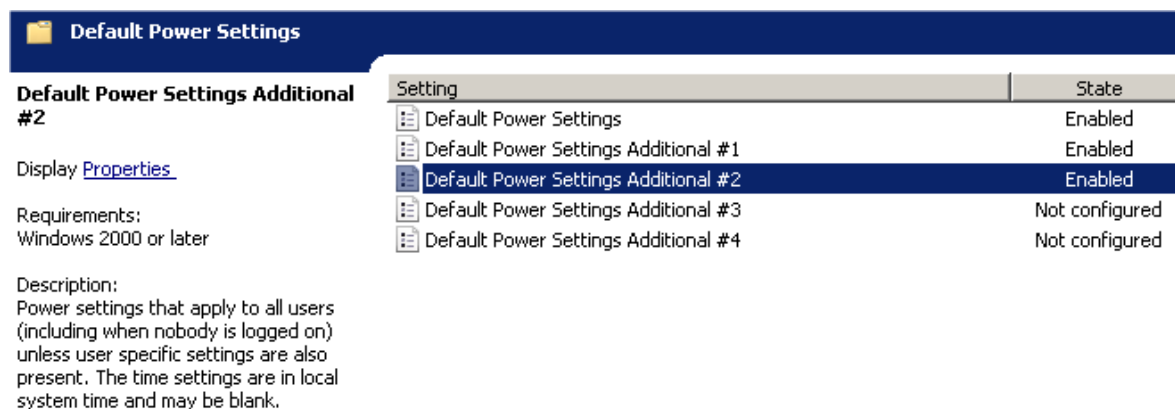
Default, No User, and specific-user idle policies

PowerMAN provides several different types of idle-based policies. Each has a specific use:

- **Default policy** – Applies whenever another policy is not applicable. This is ideal if only one policy is required or to define a fall-back policy for use when no other is relevant
- **No User policy** – Applies specifically when no user is logged on. This may be used to define a more aggressive power management strategy for this scenario. If a ‘no user’ policy is not present then the default policy applies
- **Specific user policy** – Applies when a specific user or user group member is logged on. This allows a policy tailored for the user to apply. If no user policy is defined then the default policy applies.

Multiple Policies – Precedence order

PowerMAN allows multiple policies to be defined for each of the default, no user and specific user categories. Each policy may have an optional start/end time and apply only on certain days. Either of the time fields may be left blank. PowerMAN processes the policies in **strict order** and will apply the first applicable policy at any given time.



The screenshot shows the 'Default Power Settings' window. On the left, there is a section for 'Default Power Settings Additional #2' with a 'Display Properties' link, 'Requirements: Windows 2000 or later', and a 'Description: Power settings that apply to all users (including when nobody is logged on) unless user specific settings are also present. The time settings are in local system time and may be blank.' On the right, a table lists the settings and their states.

| Setting | State |
|--------------------------------------|----------------|
| Default Power Settings | Enabled |
| Default Power Settings Additional #1 | Enabled |
| Default Power Settings Additional #2 | Enabled |
| Default Power Settings Additional #3 | Not configured |
| Default Power Settings Additional #4 | Not configured |

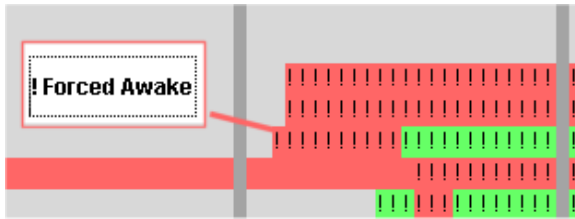
Policy enforcement feature (Anti-Insomnia)

Windows uses an idle countdown timer to track the last significant system activity. When this timer reaches zero the computer normally enters a low-power state (suspend). Activity such as keyboard/mouse or CPU usage can reset this timer and postpone the low-power state.

The Windows timer can also be inhibited or reset by applications. Applications legitimately do this when performing a critical task (such as an update) or when it would be inconvenient to the user for the system to enter a different power state. For instance, the idle timer is disabled when Microsoft PowerPoint is performing a slideshow.

In some circumstances applications may make excessive use of this feature. This is sometimes known as PC ‘insomnia’ and results in the selected power management policy not performing as expected. This will reduce system energy efficiency and increase operating costs. Depending upon the installed applications this phenomenon may almost never happen or may be a constant problem. PowerMAN includes a powerful policy enforcement feature that can be used to overcome this undesirable behaviour.

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The PowerMAN reporting system marks periods spent in this 'forced awake' state with an exclamation mark (!) symbol. This will result in increased energy consumption if it occurs during otherwise inactive (red) periods.

There are several signs that policy enforcement may be required:

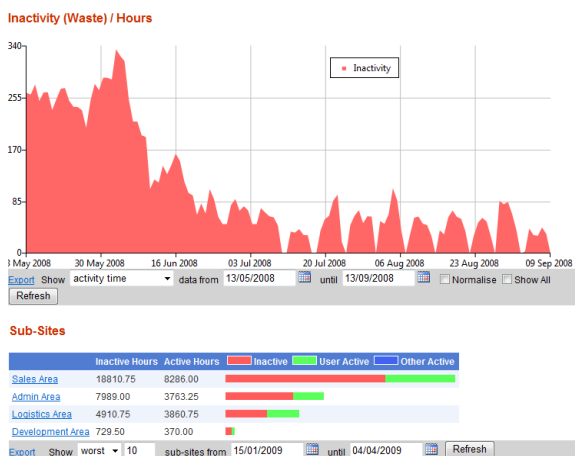
- Computer power settings often fail to behave as configured
- Power Management event log reports event #2003: **'The computer is being prevented from entering the idle state by an unknown program'**
- The historic report for a computer include significant periods marked 'forced awake' – indicated with the exclamation mark (!) symbol character

The PowerMAN Policy Enforcement feature allows you to configure a further 'grace period' timeout in **addition** to the standard timeout setting. When this time has expired PowerMAN will force the configured power action to occur. This works alongside the Protected Programs/Files feature and will not enforce a power action whilst protection is active.

The Policy Enforcement feature is enabled by default with a grace period of 15 minutes. This means that the assigned idle policy is enforced a maximum of 15 minutes after the last user activity. We recommend that this feature is not disabled to ensure maximum compliance. If necessary this feature may be configured or disabled.

Monitoring progress with PowerMAN reporting

PowerMAN allows PC operating information to be logged on a per-computer basis. This information is aggregated for each site and may be used to understand the usage profile of managed PC equipment, create a tailored management policy and monitor the on-going effectiveness of the policy. This process is fully described in a separate PowerMAN Server Platform guide. This section is designed to give you a brief overview of the features available.

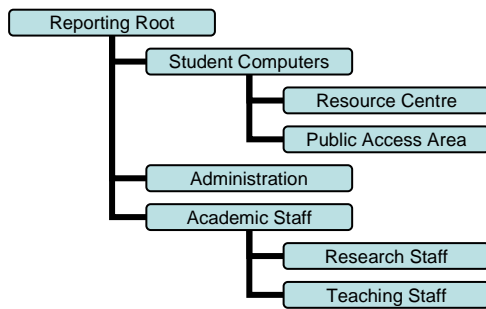


The PowerMAN reporting platform is available as either stand-alone, PowerMAN Enterprise Server, software or as a hosted service. Both product editions offer the same reporting features.

The system presents PC power related information in a variety of graphical and tabular formats. The reporting system has the following key features:

- Rank computers by inactivity level and highlight the most and least wasteful computers
- Group similar computers, display summary information and drill-down to individual PCs

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- Minimal network overhead at <0.5KB per PC/day. Only anonymous data is logged
- Addition 2-4KB per PC/day if live reporting feature is also enabled
- Download data in Excel compatible format

Tip: We recommend that each physical or functional area is reported on separately. We also recommend that each area with a distinct power management strategy is reported on separately. This will allow the effect of the strategy to be clearly measured.

Information is collected in an **anonymous format** that cannot be used to identify a specific user or the activity the user was performing. The information is uploaded in XML format using the industry standard HTTP POST protocol that is designed to work with proxy servers and network filtering. The protocol of the transmitted data is available, upon request, from PowerMAN Technical Support.

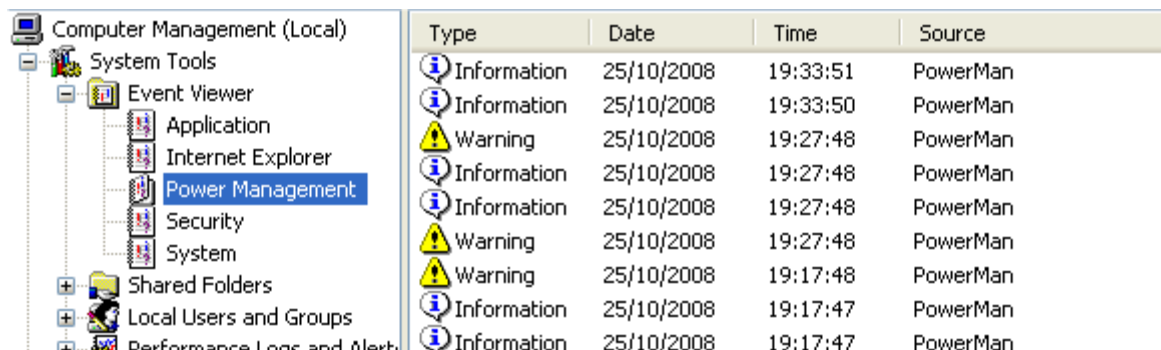
The statistics for a site can be viewed by visiting a specific URL on the PowerMAN logging server. The default hosted server provided with PowerMAN is www.pmstats.org:443. Detailed logs are normally retained for at least three months and after this period summary information is retained for at least a further year

Power Management Event Log

PowerMAN incorporates a powerful power management event logging feature. This can be accessed with the standard Windows event viewer tool **Eventvwr.exe**.

The event log combines relevant power related events together with PowerMAN activity in chronological order. This information can be extremely useful when investigating power management problems or fine tuning settings. There is a summary of the most commonly logged events in an appendix at the end of this document.

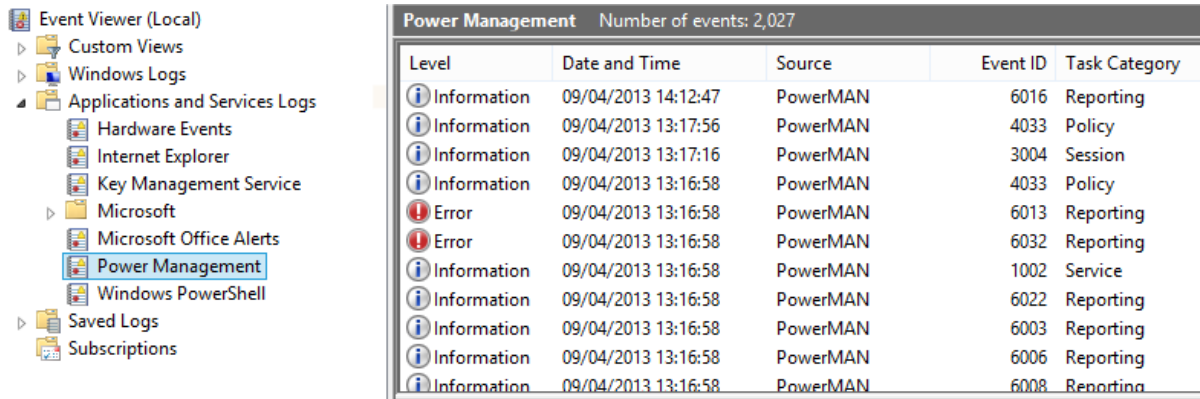
PowerMAN event log on Windows XP/2003:



| Type | Date | Time | Source |
|-------------|------------|----------|----------|
| Information | 25/10/2008 | 19:33:51 | PowerMan |
| Information | 25/10/2008 | 19:33:50 | PowerMan |
| Warning | 25/10/2008 | 19:27:48 | PowerMan |
| Information | 25/10/2008 | 19:27:48 | PowerMan |
| Information | 25/10/2008 | 19:27:48 | PowerMan |
| Warning | 25/10/2008 | 19:27:48 | PowerMan |
| Warning | 25/10/2008 | 19:17:48 | PowerMan |
| Information | 25/10/2008 | 19:17:47 | PowerMan |
| Information | 25/10/2008 | 19:17:47 | PowerMan |

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PowerMAN event log on Windows Vista/7/8:



| Level | Date and Time | Source | Event ID | Task Category |
|-------------|---------------------|----------|----------|---------------|
| Information | 09/04/2013 14:12:47 | PowerMAN | 6016 | Reporting |
| Information | 09/04/2013 13:17:56 | PowerMAN | 4033 | Policy |
| Information | 09/04/2013 13:17:16 | PowerMAN | 3004 | Session |
| Information | 09/04/2013 13:16:58 | PowerMAN | 4033 | Policy |
| Error | 09/04/2013 13:16:58 | PowerMAN | 6013 | Reporting |
| Error | 09/04/2013 13:16:58 | PowerMAN | 6032 | Reporting |
| Information | 09/04/2013 13:16:58 | PowerMAN | 1002 | Service |
| Information | 09/04/2013 13:16:58 | PowerMAN | 6022 | Reporting |
| Information | 09/04/2013 13:16:58 | PowerMAN | 6003 | Reporting |
| Information | 09/04/2013 13:16:58 | PowerMAN | 6006 | Reporting |
| Information | 09/04/2013 13:16:58 | PowerMAN | 6008 | Reporting |

PowerMAN can be configured to log additional information using the appropriate option under Advanced/Event Logging. The PowerMAN service must be restarted or the computer rebooted for this change to become effective.

In Windows Vista and later the Power Management event log is located under Applications and Services Logs.

Separate AC (mains) and DC (battery) policies

PowerMAN provides separate power management policies for systems running on AC (mains) and DC (battery) power. This feature is commonly used to provide for greater power saving on battery powered systems. PowerMAN uses the term AC to refer to mains power and DC to refer to battery power.

Tip: DC policies are ignored by default. This feature may be enabled by using the policy located under in the miscellaneous section. This feature may be ignored for desktop

Product Installation

Installation Prerequisites

PowerMAN supports the following platforms:

- **PowerMAN Client** – Windows 2000, Windows XP Professional, Vista, Windows 7 and Windows 8
- **Reporting Server (optional)** – Windows Server 2003, 2008 and 2012

The PowerMAN client is a common executable (EXE) on all supported versions of Windows. The client software is available in both 32-bit and 64-bit formats. The 32-bit version may be used in mixed 32/64-bit workstations estates and offers identical features on 64-bit systems.

In most cases the client software offers identical power management features on every supported Windows version. There are some minor differences between operating systems due to operating system design. Where necessary these are highlighted in this guide. In all other circumstances features and configuration are identical.

PowerMAN is designed to integrate seamlessly with a **Windows Active Directory / Group Policy (GPO)** infrastructure and can, in many cases, be configured and deployed in less than one hour.

Alternatively, PowerMAN may be installed with a variety of alternative deployment and configuration methods. Common examples are:

- ZENworks
- LANDesk
- RM Community Connect
- Altiris
- HP OpenView
- SMS
- SCCM
- XCOPY installation (single self-installing EXE)

The following sections explain the two most common deployment methods using Windows GPO and an SMS/XCOPY installation. It also explains how the registry settings may be created, without an Active Directory infrastructure, using a standard Windows XP or later client computer. The appendices at the end of this guide cover more specific installations for ZENWorks and RM Community Connect.

Getting to know your hardware

Before commencing a live PowerMAN deployment we recommend you spend some time investigating your PCs to understand what power management features they support. This information can be invaluable later when planning a power management strategy or troubleshooting a problem.

The following checks may be performed using the PowerMAN.exe located in the Standalone folder of the product distribution.

1. First, check the power management capabilities of a sample PC with the command:

```
POWERMAN INFO
```

PowerMAN will display useful technical information about the PC. The power capability information is located at the end of the display. A typical abbreviated output would be:

```
SystemPowerCapabilities:
PowerButtonPresent      1
SleepButtonPresent     1
Supports S1 (CPU Sleep) 0
Supports S2 (Sleep)    0
Supports S3 (Standby)  1
Supports S4 (Hibernate) 1
Supports S5 (Off)      1
...
Min RtcWake State      S3 (Standby/STR)
Min DeviceWake State   Unspecified
DefaultLowLatencyWake State Unspecified
```

The five 'Supports Sx' fields indicate which low-power state are supported. Generally support for any one of S1-S3 (sleep) and S4 (hibernate) is desirable. In some cases it may be possible to change the modes supported by amending the appropriate BIOS setting.

The 'Min RtcWake state' field indicates the maximum low-power state that the system may self-resume (automatically wake) from. This is usually S1-S4. If you intend to use the scheduled wake-up feature you should consider this field when determining which low-power states to use.

2. Secondly, you can check that the computer can sleep/hibernate and then self-resume about one minute later by using the following two commands:

```
POWERMAN SLEEPCHECK
```

or

```
POWERMAN HIBERCHECK
```

Deployment Preparation

Before starting on a PowerMAN deployment there are a few essential steps to prepare:

1. **Obtain a unique product key** – There are two different types of product keys available:
 - **PowerMON (Reporting only)** – PC power usage information is reported a PowerMAN server for analysis and display. This is ideal for environments with an existing power management system or for long-term audit purposes.
 - **PowerMAN (Full product)** – In addition to the reporting features above, all power management features are enabled. PowerMAN can apply and manage all power policies.

For the purposes of this document the following *fictitious* information is used:

Organisation: Example Corporation Limited
Product Key: XGHK-GABQ-GDTH-UJKQ-HYJK-DBKY

NB: This product key is a demonstration key and will not function on a live system. Please remember the client product key and the server product key **are different**.

PowerMAN **evaluation product keys** are designed to expire. When this happens PowerMAN stops applying new power settings and stops reporting usage information to the reporting server (if applicable). The PowerMAN service continues to run and internally cache PC usage information. In a normal configuration the log data is retained, by default, for 28 days. If a new product key is applied PowerMAN resumes normal operation following the next system reboot.

There is **no user pop-up** when the product key expires and the process is transparent to the user. PowerMAN continues to report in the event log.

2. **Select a PowerMAN reporting strategy** – PowerMAN may be used with three different reporting strategies:
 - **No reporting** – Power management only
 - **Hosted power reporting** – Running on Data Synergy or partner servers
 - **Private reporting** – Local PowerMAN Enterprise Server software

The hosted reporting system minimises installation time and avoids the need to provision a private server. The reporting features available are identical to the standard PowerMAN Enterprise server environment.

3. **Determine if PowerMAN live reporting is required** – PowerMAN v5.3 and later includes optional support for additional “live” power management reporting. This additional reporting feature provides contemporaneous throughout the day at the cost of 2-4KB of additional network traffic. This feature is only available if normal PowerMAN reporting is also enabled.
4. **Select a deployment method** – PowerMAN may be deployed using a variety of methods. The two most common methods, Windows Group Policy and an XCOPY style deployment are described in the following sections. The appendices at the end of this document contain worked examples for other installation methods.

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5. **Select a deployment strategy** – PowerMAN works best if it is used progressively to introduce power saving. The recommended approach for a new installation is as follows:

- Initially deploy with monitoring enabled but no active power management
- Wait several weeks for a usage pattern to emerge (two complete weeks is usually sufficient)
- Activate some modest power settings. Typically these may include turning off PC's that are not logged on and turning off monitors after a few minutes. Wait another period to observe the effect of these changes before proceeding. This initial policy need not be visible to users.
- Apply some more aggressive power settings. There are a number of approaches to this depending on the operation scenario. For example, some organisations hibernate computers that are not being actively used after 30 minutes. In a public access area, where a user should not be left logged on for prolonged period of inactivity it may be appropriate to shut down the computer (with suitable warning) after 10 minutes.
- If appropriate consider communicating the strategy and on-going progress to the users. Some sites have reported that user participation may itself contribute significantly to real energy savings. It is even possible to create league table of the most wasteful users or departments!
- Consider applying other settings that may be beneficial to users such as automatically starting PCs at a certain time in the morning. Please remember, of course, that in some scenarios with irregular usage patterns (such as libraries) this may result in a significant increase in energy consumption
- Consider enabling the PowerMAN user interface icon. This may be used to permit some users to opt-out of the managed policy or to view their personal workstation PowerMAN statistics.
- Continue to monitor the site periodically and ensure that the current settings are working effectively.

Preparation for PowerMAN reporting (Optional)

PowerMAN reporting complements the PowerMAN client software by providing powerful, enterprise-wide, reporting of PC energy usage, costs and waste. The reporting software is available as both a hosted environment or traditional PowerMAN Enterprise server software running on an in-house server.

The reporting is optional – the PowerMAN client software will function fully without it. However, the reports can be extremely useful to monitor the on-going effectiveness of your PowerMAN installation and determine where further improvements can be made.

PowerMAN reporting is simple to configure but will work best if the reporting strategy is planned in advance. PowerMAN refers to groups of associated computers as a 'Site' and uses a unique identity, called a SiteGUID, to associate the workstations for reporting purposes. The SiteGUID must be registered with the reporting server for the data to be correctly attributed. Each site may also be given a friendly description.

Tip: PowerMAN Enterprise Server v5.2 and later supports automatic creation of reporting sites based upon the Active Directory membership of each workstation. To use this feature deploy a **single 'root' SiteGUID** to all workstations and enable automatic site creation on the server. Please see the PowerMAN Enterprise Server documentation for further details.

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To prepare for reporting proceed as follows:

1. **Identify a group or multiple groups of PCs for deployment** – Each group of related PCs is known as a PowerMAN 'site'.

An **ideal site** is a group of similar PC's within a defined environment such as an office, department or computer room. It is also good practice to use a separate site for areas with **distinct power management strategies**. This will allow you to compare areas.


A typical site can have from 20 to several hundred computers and will be **suited for managing as a single entity**. After deployment you should try not to change the scope of the site (it is easy to create another one) as this may reduce the quality of the report data gathered.

You can easily create additional sites to logically divide your estate of managed computers and nest sites within one another to reflect your organisation structure.

There is no limit on the number of sites supported.

2. **If using manual site creation, allocate a unique SiteGUID for each site** – A SiteGUID may be generated on the PowerMAN reporting website using the **Add/Move Site** link:

Example Corporation Limited

| | | |
|---|-----------------------------|--|
| Organisation | Example Corporation Limited | OU=Desktop,DC=corp,DC=local |
| Created | 01/01/2009 | First Data 25/02/2008 |
| Expires | Never | Last Data 25/04/2009 |
| Min. Data Retention  | Unlimited | Total Computers 104 Export |
| | | Total Sub-Sites 2 Export Add/Move Site |

It may also be generated by a standard GUID generation program or by using the `makeguid` command built-in to PowerMAN:

```
D:\>POWERMAN MAKEGUID
```

```
{f2822500-7128-48ac-89c4-f9a15274afbd}
```

A SiteGUID created using this method **MUST** be registered on the server by using the Add/Move Site link before reporting can function.

Tip: PowerMAN software evaluations are usually supplied with an initial **Root SiteGUID** for the hosted reporting system.

This may be used directly to for basic reporting. In this case you do **not** need to create a new SiteGUID. Larger organisations may wish to create a hierarchy of sub-sites allocated each area separate SiteGUID. In this case the Root SiteGUID may be ignored.

3. **Alternatively, if using PowerMAN Enterprise Server v5.2 or later with automatic site creation enabled, determine the root SiteGUID from the server and deploy this to all workstations** – This is the SiteGUID associated with the reporting location you wish to treat as the AD root. All further reporting sites will be automatically created below this level.

Microsoft Windows Group Policy Deployment Method

The most common way to deploy the PowerMAN client software is using Windows Group Policy. This feature is available on any network running Windows 2000 Server or later. The example below uses the Group Policy Management Console (GPMC) which is available from Microsoft as a free download (this is built into later versions of Windows 2003 Server and later). If GPMC is not available then the older GPEDIT tool (which is built in to Windows) may also be used.

Group Policy Management Console (GPMC) is available from:

<http://www.microsoft.com/downloads/details.aspx?FamilyID=0A6D4C24-8CBD-4B35-9272-DD3CBFC81887&displaylang=en>

PowerMAN client deployment requires two core files. These are the only files you need to perform an installation:



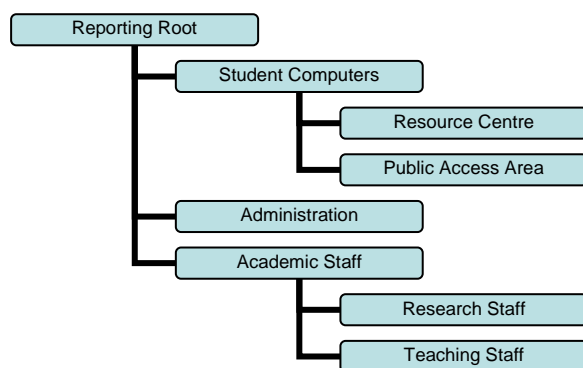
PowerMAN Setup.msi contains the PowerMAN program in a deployable form. This may be installed manually or via Windows GPO. This file also deploys the separate PowerSTART application that may be used to launch programs that require the system to remain active.



PowerMAN5.adm / PowerMON5.adm is an Administrative Template that is loaded onto the Windows Server and used to configure the PowerMAN or PowerMON software. An **ADMX** file is also provided for use on Windows 2008 and later servers. The policy features available are identical. We recommend using the ADMX if supported.

Making effective use of policy inheritance (Larger networks)

The supplied ADM/ADMX file can be used for both deployment and configuration. The basic example below assumes that there is only a single Organisation Unit (OU). However, PowerMAN fully supports operation in a diverse, multi-OU, network.



The ADM/ADMX file may be used to create several Group Policies to deploy unrelated settings at different OU levels. By default Group Policy will automatically propagate policies using inheritance so that lower objects receive the combination of higher level policies.

A common approach is to deploy the software and common settings (for instance the PID key) at the top level and apply more specific policies for child OUs.

Policy elements may be freely mixed in this way. **The only requirement is that a specific policy setting must only be applied once.**

Tip: A common configuration mistake is to create a separate PowerMAN policy for each distinct OU and duplicate settings. In a small Active Directory this may be acceptable but generally it should be avoided. **If you find yourself duplicating the same setting several times this may indicate that the policy strategy selected is not making best use of policy inheritance.**

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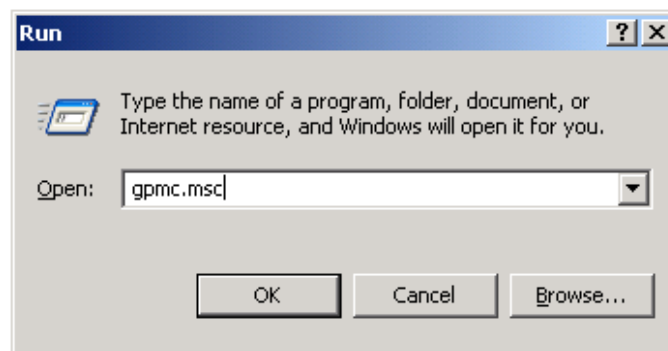
In a network with multiple policies and/or reporting units, and where policy inheritance is not blocked, we recommend that policies are applied in three distinct layers:

1. **Common policies** – License PID key etc. that apply globally
2. **Reporting unit policy** – Reporting settings applied on a per location/site basis
3. **Power management policy(s)** – Actual power management policies created for each scenario and linked to appropriate management units as necessary

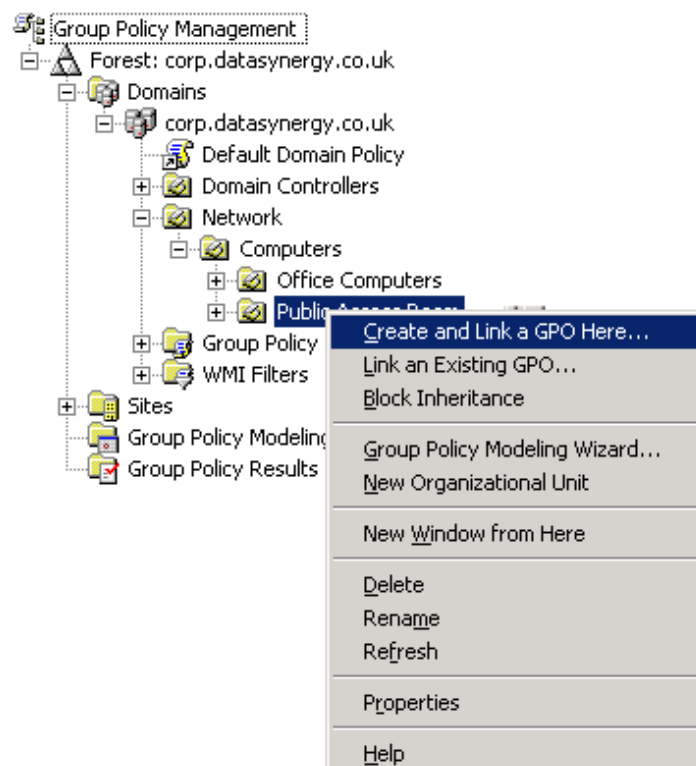
Group Policy Worked Example (Windows Server 2003 and later)

To install PowerMAN using GPO on Windows 2003 Server proceed as follows. The procedure for Windows 2008/2012 Server is almost identical:

1. Open the Group Policy Management Console (GPMC.MSC):

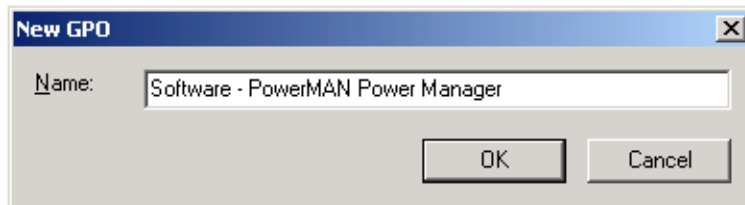


2. Locate the **Organizational Unit (OU)** that you wish to deploy the software to. The example deploys the software to a OU called **Public Access Room**

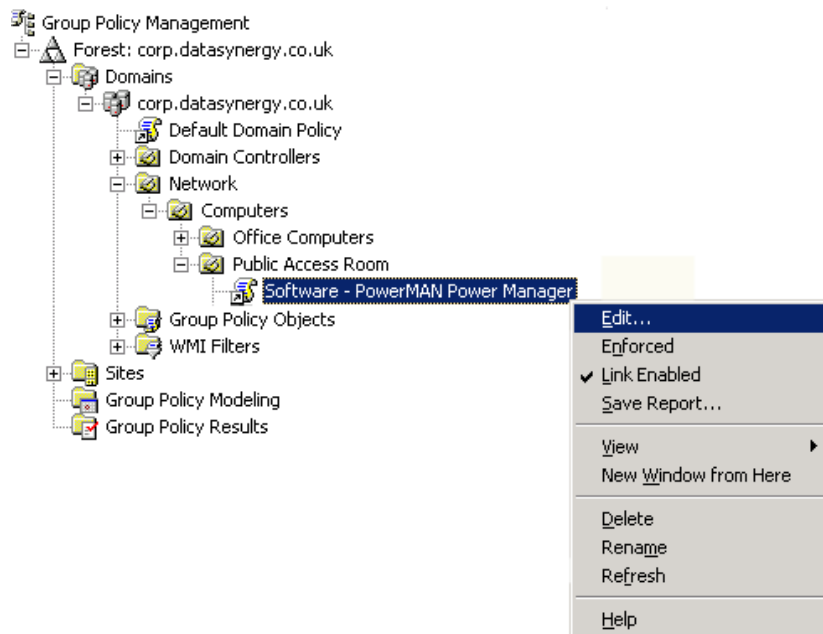


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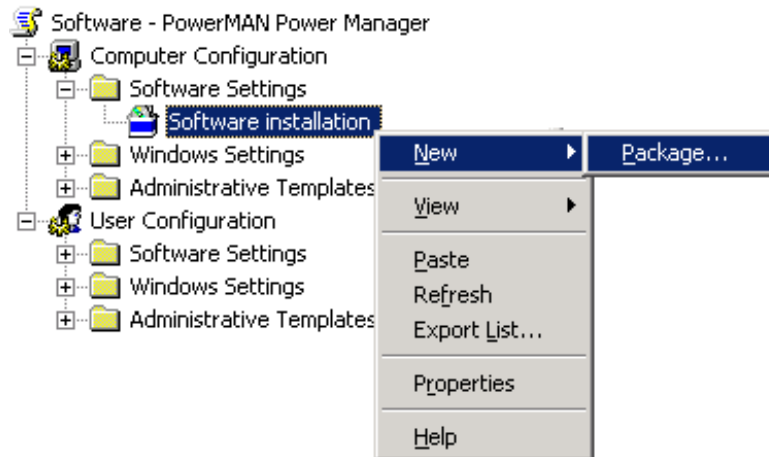
3. Right click the OU and select **Create and Link a GPO here**
4. Enter a name of the new policy and click **Ok**. The example creates a policy called **Software – PowerMAN Power Manager**.



5. Select the newly created policy, right click and select **Edit**

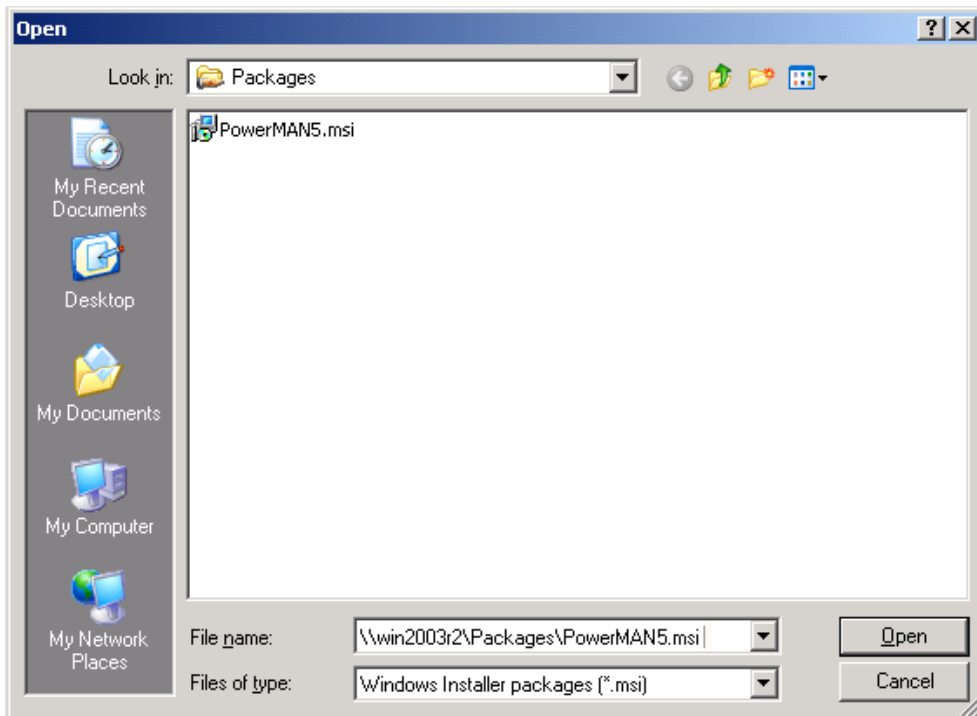


6. The **Group Policy Object Editor** should open. This is used to configure the deployment. Navigate to the **Computer Configuration** section and expand **Software Installation**. Right click and select **New/Package**:



Remember: Most PowerMAN settings are made in the Computer Configuration section of the Group Policy Editor. This is because the software must be deployed to a computer (and not a specific) user. It is possible to assign individual policies to specific users or groups of users but this should only be done in an advanced installation. It is normally possible to achieve very good results without this extra complication.

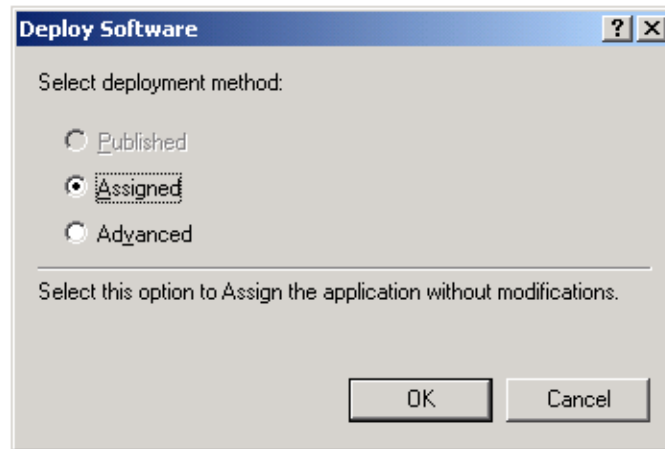
7. Browse to the network share that contains the **PowerMAN Setup.msi** file and press **Open**.



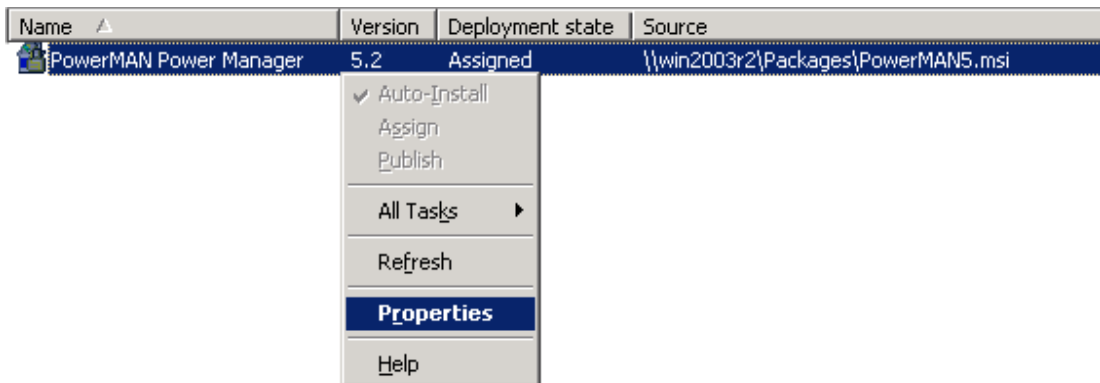
Remember: The MSI file should be placed in a **share** on the server that is accessible to the destination computers. A common technique is to grant **Domain Computers** read access of the share and underlying file system. This is explained further in the troubleshooting section below

PowerMAN Power Manager v5.3

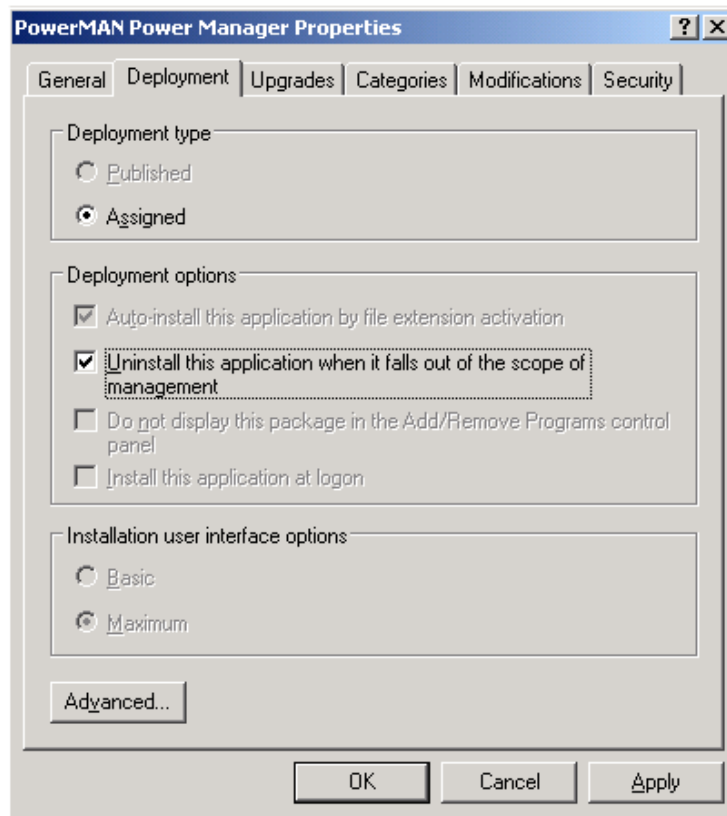
8. Select **Assigned** as the deployment method. PowerMAN is a system application and therefore it is not appropriate to 'publish' it to users:



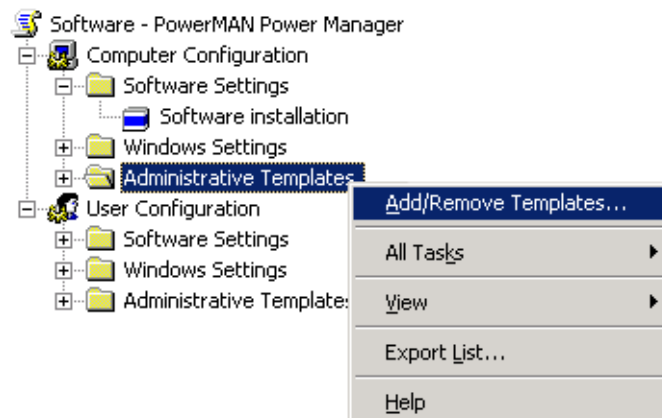
9. Right click on the newly created package and select **Properties**:



10. Select the **Deployment** tab (Advanced in some earlier service pack revisions) and tick **Uninstall this application when it falls out of the scope of management**. Click **Ok**:



11. Navigate to the **Computer Configuration / Administered Templates**, right click and select **Add/Remote Templates**:



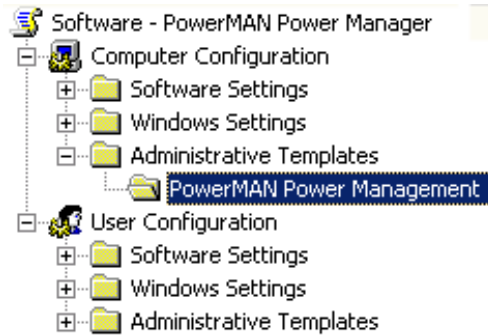
12. Click **Add** and locate the **PowerMAN5.adm** file supplied. When this is completed click **Close**. It may be helpful to remove the other administrative templates present using the **Remove** button. These are not required for PowerMAN.

Tip: An ADMX file is provided for use on servers running Windows Server 2008 and later. It provides the same features as the ADM file. To install the policy files copy the **ADMX file** and **en-US** folder to the **WindowsPolicyDefinitions** folder on the server and re-open the Group Policy editor. Please see the following microsoft documentation for further information:

<http://msdn.microsoft.com/en-us/library/bb530196.aspx>

13. The Group Policy editor should now contain a section for **PowerMAN Power Management** (other sections may be present depending on server configuration). When using the ADM file method this is located under **Administrative Templates**.

Select the **PowerMAN Power Management** section:



14. The right hand pane will display a list of the available policy settings:

| Setting | State |
|------------------------------|----------------|
| Policy Preferences | |
| Custom Actions | |
| Protected Objects | |
| Miscellaneous Power Settings | |
| Device Power Settings | |
| Scheduled Actions | |
| No User Power Settings | |
| Default Power Settings | |
| Product Licensing | Not configured |
| Power Management Reporting | Not configured |
| Resume Configuration | Not configured |
| Advanced Settings | Not configured |
| Enforcement / PC Insomnia | Not configured |
| Global Power Settings | Not configured |
| User Interface | Not configured |

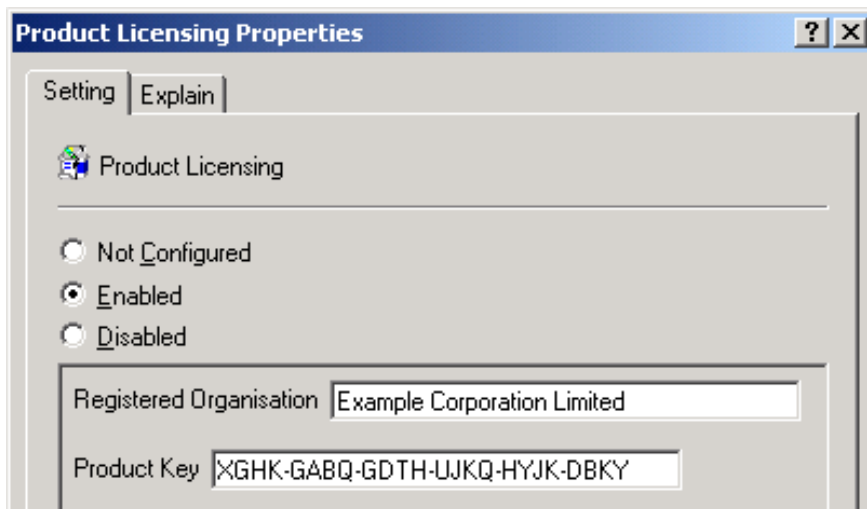
PowerMAN Configuration

The following PowerMAN configuration sections are available:

| Section | Meaning |
|-------------------------------------|---|
| Policy Preferences | Settings to manage lists of power policies that may optionally be selected by the user or external logic. |
| Custom Actions | Configure actions that occur during suspend and resume. |
| Protected Objects | Settings to configure a list of protected programs, files and times that, when present, ensure the system does not enter a low power state. |
| Miscellaneous Power Settings | Miscellaneous settings for power management |
| Device Power Settings | Settings to configure device support and behaviour in a power managed environment. |
| Scheduled Actions | Configure the system to shutdown, suspend, hibernate, reboot and resume at specific scheduled times. |
| No User Power Settings | Power settings that apply when no user is logged on (logon prompt screen) |
| Default Power Settings | Power settings that apply unless a more specific policy applies |
| Product Licensing | Product key settings. These are required for PowerMAN to fully function. |
| Power Management Reporting | Reporting site configuration information and report server settings |
| Resume Configuration | Configure system behaviour after automatic resume (auto wake-up or Wake-on-LAN) |
| Advanced | Advanced configuration and debug settings used to investigate problems |
| Enforcement / PC Insomnia | Settings to ensure other programs or Windows cannot override the selected power policy |
| Global Power Settings | Power settings that apply to all users |
| User Interface | User interface settings |

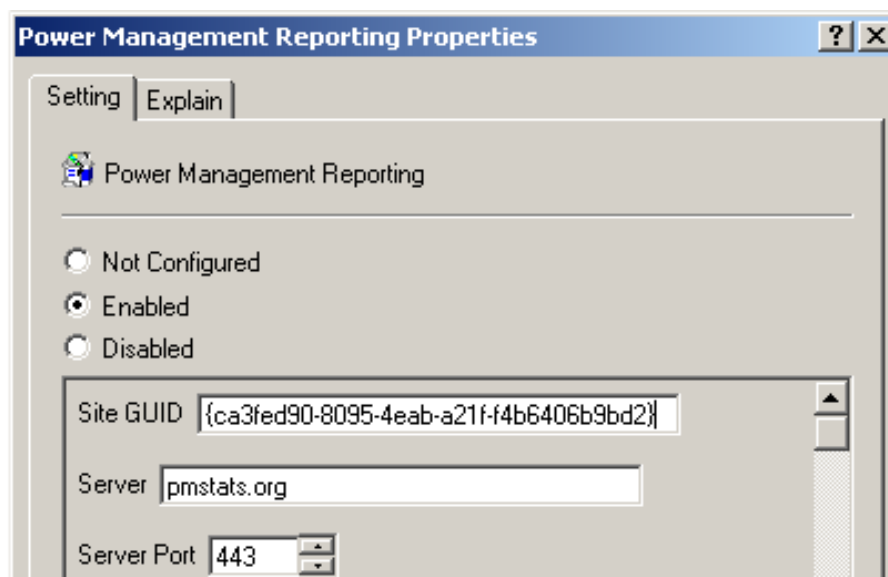
To configure the basic product licensing and reporting settings proceed as follows:

1. Open the **PowerMAN Group Policy** previously created
2. Select **Product Licensing**, right click and select **Properties**
3. Select **Enabled**, carefully enter the product details supplied with the software, and click **Ok**



To configure the optional PowerMAN reporting settings proceed as follows:

1. Select **Power Management Reporting**, right click and select **Properties**
2. Select **Enabled** and configure the appropriate SiteGUID and reporting server details:

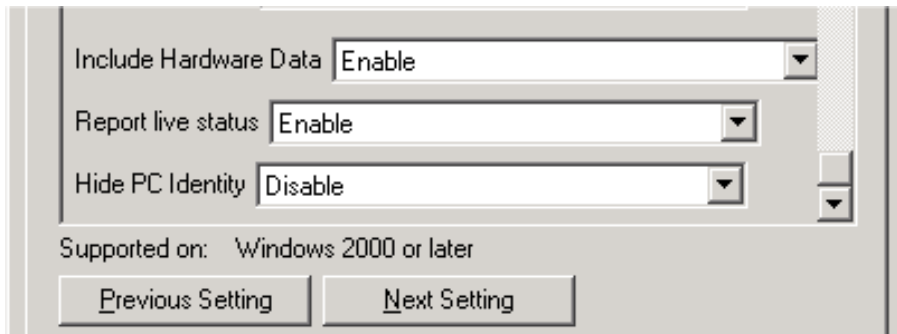


A basic PowerMON or PowerMAN deployment, operating in reporting-only mode, requires **only five** settings:

- Registered organisation name
- Registered product identification key (PID key)
- SiteGUID – You can generate this on the reporting system
- Logging server name – The default hosted server is **pmstats.org**
- Logging server port – The default hosted server port is **443**. The default PowerMAN Enterprise Server port is **8080**

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Optionally you may also wish to enable hardware information and live reporting:



Finally, on more advanced installations may also require::

- Proxy server name
- Proxy server port
- Log Backup File

These settings may be ignored if they are not required. Please remember to ensure that your site firewall / proxy server will allow **http protocol** traffic to the logging server.

To complete the basic configuration click **Ok**

3. Close the Group Policy Object Editor and test the policy works by restarting a computer in the relevant Organisation Unit.
4. As the computer starts you should see the PowerMAN Power Management application install prior to the display of the logon prompt. If this does not happen please consult the troubleshooting section below.

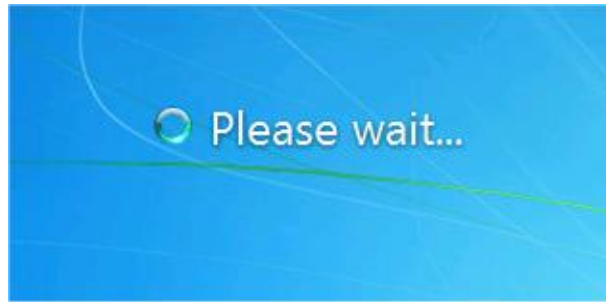
Tip: Depending upon server configuration, timing and any other pending updates a second reboot may sometimes be necessary for the client software to complete installation. This is completely normal.

On Windows XP, for example, the following dialogue is displayed:

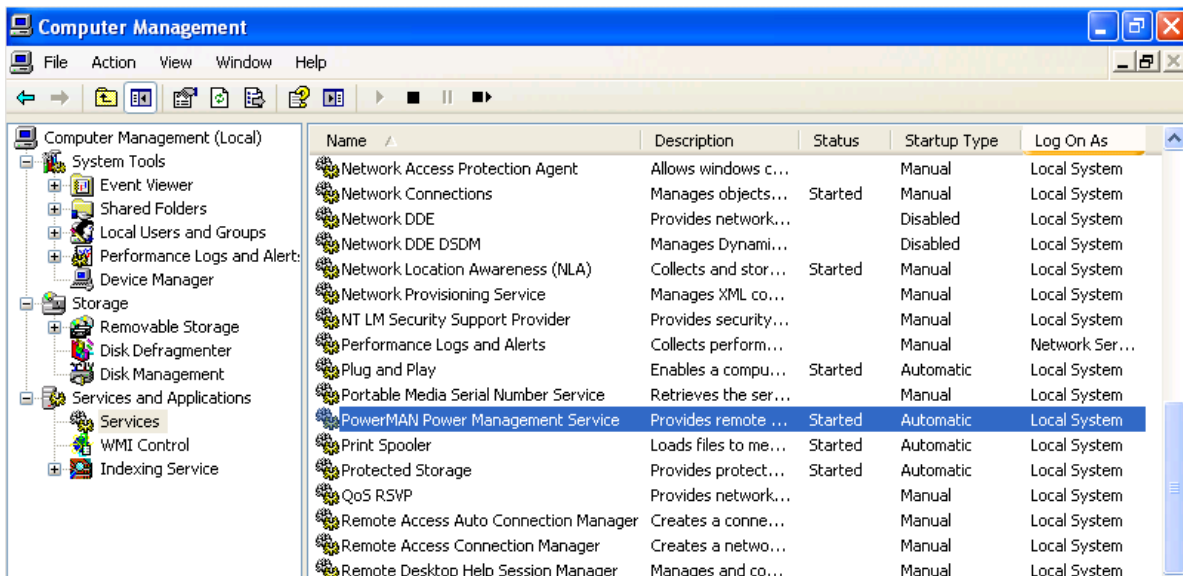


Whilst on Windows 7 the following dialogue is displayed during installation:

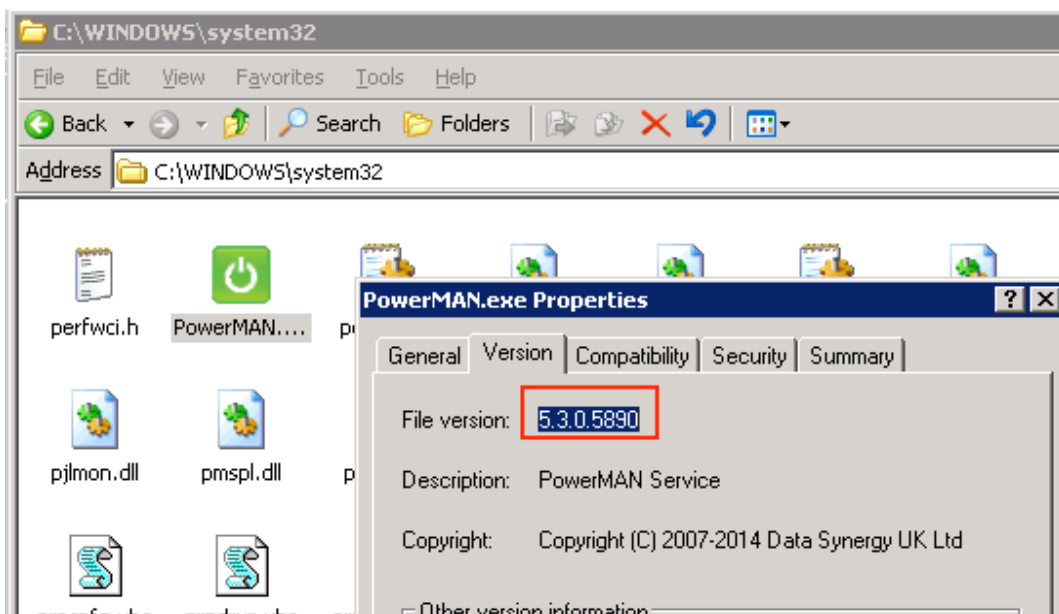
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- Confirm that the service has fully installed by opening the Computer Management Console (compmgmt.msc) and checking the status of the **PowerMAN Power Management** service. The service should be already **Started** as shown below:



- If necessary you can always verify the version of the PowerMAN service by locating the program in the **Windows\System32** folder:



Alternative SMS / XCOPY Deployment Method

PowerMAN supports a variety of deployment methods. The so-called **XCOPY** method describes the most basic, manual, technique for installing the program. This may be adapted for environments such as SMS as required. This section explains the key features of such a deployment

- Obtain the PowerMAN installation file and install on the destination PC. There are several alternative ways for an Administrator level user to do this:
 - Double click the MSI file and follow the on-screen prompts



- Install the silently with the following command line:

```
MSIEXEC /I:"PowerMAN Setup.msi" /qn
```

- Locate the PowerMAN.exe file in the Standalone folder (supplied with the PowerMAN distribution) and copy it to the \Windows\System32 folder on the destination computer:



This last method requires the service to be separately installed. This is only required the first time. Log on with an account that has administrative rights and execute the following command:

```
POWERMAN START
```

The PowerMAN.exe file is the **ONLY** file required on the client computer.

You may optionally wish to use the separate PowerStart.exe program. This can be installed by simply copying it to the \Windows\System32 folder.

Remember: The PowerMAN service must be installed by a user with local administrative rights. It is not possible to install PowerMAN using a logon script (which runs as a user). It is possible to install PowerMAN with a computer start-up script. See the following web page for an example:

[http://technet.microsoft.com/en-us/library/cc779329\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc779329(WS.10).aspx)

PowerMAN Power Manager v5.3

Deploy the required configuration settings using the Windows **Local Group Policy**, **REG.EXE** or **REGEDIT** tools. The section 'Alternative Configuration Method - Local Group Policy / Registry Settings' at the end of this document explains how this may be done. As noted above the minimal required settings are normally:

- Registered organisation name
- Registered product identification key (PID key)
- SiteGUID – You can generate this with the **MAKEGUID** command
- Logging server name – The standard server is **pmstats.org**
- Logging server port (usually 443 for hosted system and 8080 for PMES)

Deploying PowerMAN in a pre-built software image 'Ghost'-style deployment

PowerMAN fully supports deployment in a pre-built software image. This is sometimes known as a 'Ghost'-style deployment. Typically, in this scenario, PowerMAN is manually installed on a master computer. In some cases some initial settings may be configured using Local Group Policy or similar. This computer is then cloned on to multiple destination computers. There is one important thing to remember when performing such a deployment:

Remember: The `ClientGUID` value is used to uniquely identify each computer. This is automatically generated and should not be cloned from one computer to another. If this field is removed PowerMAN will generate a unique new `ClientGUID`. If the same `ClientGUID` is present on multiple computers this will prevent the reporting feature from operating correctly. Please remember to remove the `ClientGUID` prior to creating the master software image. The easiest way to do this is to stop the PowerMAN service and then use the `RegEdit` tool to delete the setting from the `HKLM/Software/PowerMAN` registry key. This step should be performed just prior to creating the software image.

Deploying PowerMAN updates

PowerMAN is periodically updated. This may be necessary to resolve minor product problems or introduce new features. **For technical reasons the MSI file supplied with PowerMAN does not support in-place upgrade installations.** Therefore the existing PowerMAN installation must be removed prior to installing a new one. This is a transparent process and no reporting continuity will be lost if PowerMAN is immediately replaced. There are several ways to achieve this:

- **Using Group Policy for deployment (recommended method):** Create a new PowerMAN policy and unlink the old one. The old installation will be removed and the new one installed the next time the workstation is rebooted. This should normally only require a single reboot.
- **Using Group Policy for deployment (alternative method):** Use the Group Policy update feature by amending the existing policy to update the deployed MSI file. This is supported because Group Policy automatically removes the old software before deploying the new version
- **Non-Group Policy deployments (e.g. SMS/XCOPY etc.):** Use a deployment script that executes the following sequence:
 - `POWERMAN REMOVE`
 - `Copy new PowerMAN.exe to \Windows\System32`
 - `POWERMAN INSTALL`

Removing PowerMAN (Uninstallation)

PowerMAN may be removed using the reverse of the mechanism used to install it:

- **Group Policy based deployment:** Unlink the policy. PowerMAN will be removed following the next system reboot
- **Non-Group Policy deployment (e.g. SMS/XCOPY etc.):** `POWERMAN REMOVE`

When PowerMAN is uninstalled the cached reporting information is retained in the Registry. This allows a subsequent installation to continue the reporting process with no loss in data continuity. To completely remove PowerMAN and the Power Management event log the following Windows commands may be used:

```
REG DELETE "HKLM\SYSTEM\CurrentControlSet\services\eventlog\Power  
Management" /f
```

```
REG DELETE "HKLM\SOFTWARE\PowerMAN" /f
```

PowerMAN Configuration

PowerMAN provides support for a wide variety of power related settings. The following sections provide a summary of the supported configuration features.

Tip: Unless stated otherwise all times are local times (to the PC) and in 24-hour format.

Product Licensing

The **Product Licensing** settings are used to configure the unique organisation product license. These **MUST** be configured for PowerMAN to function:

| Setting | Meaning |
|-------------------------------|---|
| RegisteredOrganisation | The organisation that PowerMAN is licensed to. This must be spelled exactly as supplied. e.g. Example Corporation Limited |
| RegisteredProductKey | The unique product key (PID) required to activate the software. This is exactly six groups of four characters separated by five dashes. e.g. XGHK-GABQ-GDTH-UJKQ-HYJK-DBKY |

Power Management Reporting

The **Power Management Reporting** settings are used to configure site membership and reporting server. These can be disabled if reporting is not required. This is, however, not recommended, because it will mean there is no direct way to measure site performance or fine tune the configuration.

| Remote Management and Monitoring | Meaning |
|----------------------------------|--|
| Site GUID | Unique site identity used to track a group of computers that are managed as a single entity. This value can be generated on the server or with the <code>Makeguid</code> command. e.g. {5c952c78-832f-4b68-bbf3-9986262e55ed} PowerMAN Enterprise Server v5.2 and later supports automatic site creation. If this feature is being used then all workstations should be assigned the root SiteGUID. Please see the PowerMAN Enterprise Server documentation for further details. |
| Server | The address of the logging server. This can be blank if management reporting information is not required. The standard logging server is pmstats.org |
| Server Port | The port number of the logging server. This is usually 80, 443 or 8080. The pmstats.org hosted reporting system is available on ports 443 and 8080 . A private PowerMAN Enterprise Server may be configured to run on any port. |

| | |
|------------------------------|---|
| Proxy | The address of the local proxy server that PowerMAN must use to send management information to the logging server. This can be blank if a proxy server is not required. |
| Proxy Port | The port number of the proxy server. This is typically 8080 and is ignored if no proxy server is configured. |
| Log Backup File | <p>Some sites frequently re-install (sometimes called re-image) workstations to ensure a smooth user experience. A similar scenario occurs when system protection software such as Faronics Deep Freeze or Microsoft Steadystate is used. In such configurations the most recent power usage information can be lost during a re-installation. This can result in the PowerMAN reporting feature providing only intermittent data. This can be avoided by configuring PowerMAN to store a backup of the usage information. It is the responsibility of the system administrator to ensure that this file is protected during the reinstallation process by either excluding it from being over-written or by moving it to a safe location. This setting must refer to a <i>local</i> path.</p> <p>e.g. %windir%\system32\logfiles\PowerUsage.xml e.g. T:\PowerUsage.xml</p> <p>Tip: If the workstation is not frequently re-installed this setting may be left blank. When used with Faronics Deep Freeze this file may be located in the 'Thaw Space'. This may optionally be hidden.</p> |
| Report Live Status | <p>Report contemporaneous power status information whenever a significant power management event occurs. This includes:</p> <ul style="list-style-type: none"> • Start-up / shutdown • Sleep or hibernate • Resume • User logon / off • Battery / Mains power source <p>NB: This feature will generate a very small amount (approximiatly 2-4KB) of additional network data per day/workstation. This feature requires PMES v5.3.</p> |
| Include Hardware Data | <p>Report hardware details about the current workstation including:</p> <ul style="list-style-type: none"> • Number of CPU sockets / cores / logical processors • Estimated CPU speed (MHz) • CPU make / model • Installed RAM • Motherboard make / model • BIOS make / version / release date • Number of hard / optical disks <p>NB: This feature requires PMES v5.3.</p> |
| Hide PC Identity | Do not report the computer name or MAC address. This may be desirable to further anonymise the PowerMAN data collected. Enabling this feature will make it impossible to determine which workstation generated the data. |

Default and No User Power Settings

The **Default Settings** and **No User Power** features allow idle policies to be configured for all users and when nobody is logged on respectively. If a 'No User' policy is not specified then the default policy also applies when nobody is logged on.

In some situations it may be desirable to employ a separate, often stricter, policy when no user is logged into the computer. For instance, it is often acceptable to shut down a computer when no user is present although this may be unacceptable for a user is logged in. The **No User Power Settings** section allows you to configure a separate policy for this situation. The majority of the settings are comparable to those available in the Windows XP control panel applet (Powercfg.cpl).

Tip: In addition to supporting distinct policies for different user scenarios, PowerMAN also allows different policies to be active at different times. These features may be combined to create a layered power management strategy where different policies apply at different times and to different users. PowerMAN prioritises the policies in numerical order and implements the first applicable policy.

| Setting | State |
|--------------------------------------|----------------|
| Default Power Settings | Enabled |
| Default Power Settings Additional #1 | Enabled |
| Default Power Settings Additional #2 | Enabled |
| Default Power Settings Additional #3 | Not configured |
| Default Power Settings Additional #4 | Not configured |

Tip: Take care to avoid overlapping policy times. PowerMAN will always use the first applicable policy and therefore will normally ignore an overlapping policy.

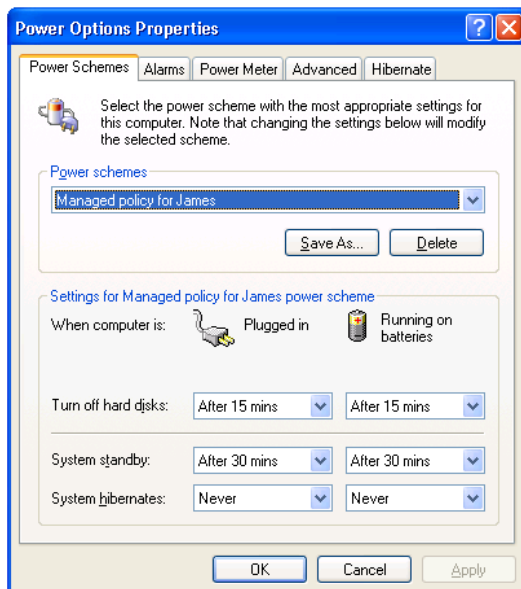
| Default Power Settings | Meaning |
|--------------------------|--|
| Logout Timeout AC | The inactive time in minutes, when running on AC (mains power), that will trigger the user to be logged out. |
| Logout Timeout DC | As above but applies when running on battery power. |

The following settings are available for both the Default and No User configurations:

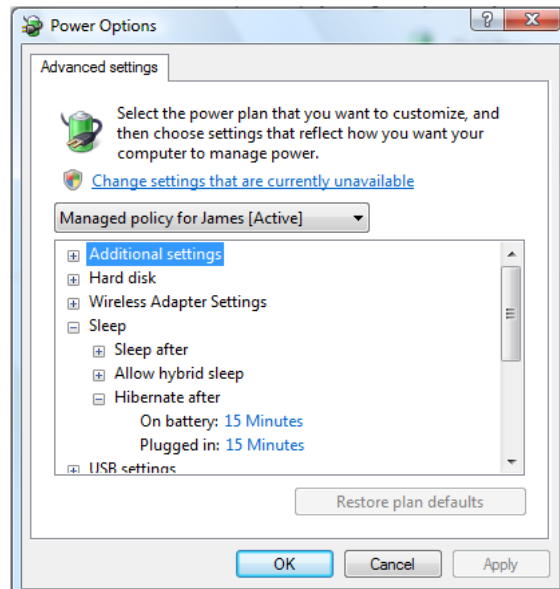
| Default and No User Power Settings | Meaning |
|--------------------------------------|--|
| Policy Name | A name to identify the policy. This is displayed in the Control Panel power applet and also used in the power management event log. The policy name is mandatory. |
| Idle Action AC | The action to take (shutdown, suspend, hibernate, nothing) upon entering the idle state |
| Policy Applies | The days that the policy will apply |
| Start Time (hh:mm) (Optional) | The time of day the policy starts to apply. This may be blank. A blank time is treated as 00:00. |
| End Time (hh:mm) (Optional) | The time of day the policy ceases to apply. This may be blank. A blank time is treated as 23:59. |
| Idle Timeout AC | The inactive time in minutes, when running on AC (mains power), that will trigger the idle action. |
| Idle Action DC | As per Idle AC but applies when running on battery power. |
| Idle Timeout DC | As above |
| Monitor Off AC | The inactive time in minutes, when running on AC power, before switching the console monitor off. |
| Monitor Off DC | As per Monitor Off AC but applies when running on battery power. |

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| | |
|----------------------------------|---|
| HDD Off AC | <p>The inactive time in minutes, when running on AC power, before switching the hard disk off.</p> <p>NB: This policy may not be very effective on many systems that perform frequent background tasks. See troubleshooting section for further information.</p> |
| HDD Off DC | <p>As per HDD Off AC but applies when running on battery power.</p> |
| CPU Performance AC | <p>The processor throttling policy to apply when running on AC power:</p> <p>Adaptive – Match performance to demand</p> <p>Degrade – Maximize energy saving by reducing CPU performance</p> <p>None – Maximize performance (increased energy consumption)</p> <p>Processor throttling is not available on all hardware and is ignored if it is not supported. Energy consumption can be dramatically reduced when CPU Performance is set to degrade. This is especially useful when no user is present as it unlikely to have any adverse impact. See the following for additional information:</p> <p>http://www.microsoft.com/whdc/archive/winpowmgmt.msp</p> |
| CPU Performance DC | <p>As per CPU Performance AC but applies when running on battery power.</p> |
| Preference Tag (optional) | <p>See policy preferences section for further information. This setting may be blank.</p> |



PowerMAN running on Windows 2000 / XP



PowerMAN running on Windows Vista / 7 / 8

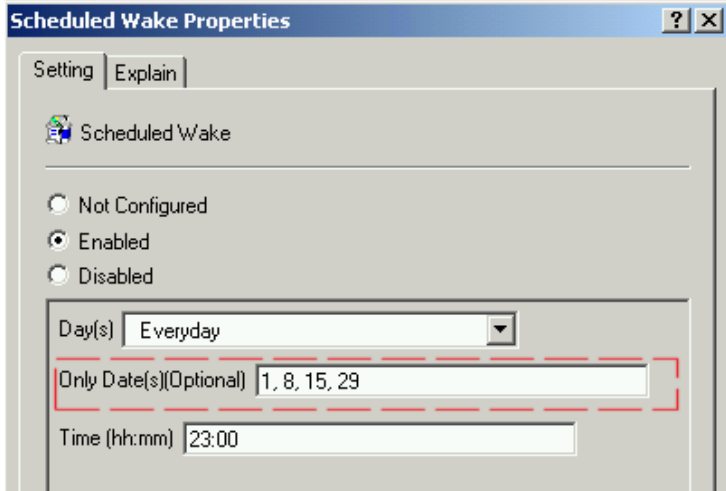
Scheduled Actions

The **Scheduled Actions** feature allows specific power management actions to occur at specific times. This can be used to shutdown, reboot or suspend the PC and optionally resume it again. Multiple scheduled actions may be configured to run concurrently.

| Setting | Meaning |
|---------------------------------------|--|
| Randomly Distribute Wake Times | Allow wake-up times to be distributed a few seconds either side of the specified time. This option is designed to avoid power surges that could result from many computers simultaneously resuming at the same time. |

Scheduled Wake (Resume)

The **Scheduled Wake** option allows you to configure a time that the computer will automatically wake from the sleep or hibernated states:

| Scheduled Wake | Meaning |
|------------------------------|---|
| Days | The weekdays that the scheduled wake policy will apply (typically All or Mon-Fri). This option may be extended by editing the ADM file. See appendix for further details. |
| Only Dates (optional) | <p>The days of the month that the scheduled action will apply. This works in combination to the weekdays specified and may be left blank if not required.</p> <p>e.g. To wake on the 1st, 8th, 15th and 29th of each month at 23:00 - specify: 1, 8, 15, 29 and set days to "Everyday"</p>  |
| Time (hh:mm) | The local time that the computer is scheduled to wake. Typically this value is set to be a few minutes before the user requires the computer. Remember that, depending on other power settings, the computer may shutdown or sleep if no activity occurs within the timeout period. |

PowerMAN uses two complementary systems for PC wake-up.

The scheduled wake-up feature uses the timer built-in to most modern computers. This is more reliable than Wake-on-LAN (WoL) techniques and does not require any network communication. You can test this feature on a PC by using the `SLEEPCHECK` or `HIBERCHECK` commands. The scheduled wake feature is not suitable for ad-hoc wake because the timer must be configured before the PC enters the low-power state.

The PowerMAN server system also allows you to perform ad-hoc system wake-up. This can be accomplished by clicking the link provided on the server reports or by manually forming the required wake URL. This feature requires the Data Synergy WakeMAN software.

To use a WoL based technique some computers will need this feature to be enabled. This configuration is usually accomplished in two phases:

1. Wake-on-LAN must be enabled in the BIOS. The Data Synergy DMCMOS32 tool may be used to automate this process
2. The network card must support WOL and this must be enabled in Windows Device Manager

Remember: Not all computers support scheduled wake. This is because it requires certain circuitry to be present on the computer's motherboard. In practice, most modern computers do have this function. In some cases, it may be necessary to modify the BIOS settings to enable this feature. PowerMAN is capable of reporting if the computer *believes* it is capable of automatic wake. This reporting information is, however, not always accurate. If in doubt, please contact your PC vendor. PowerMAN Technical Support can provide further information on debugging automatic wake issues.

Scheduled wake can be especially useful when combined with an idle action of sleep or hibernate. Typically, most modern systems cannot resume from the full power-off state but can resume from sleep/hibernate. This means that a system can be automatically made available at a specific time of day such as the start of a school day.

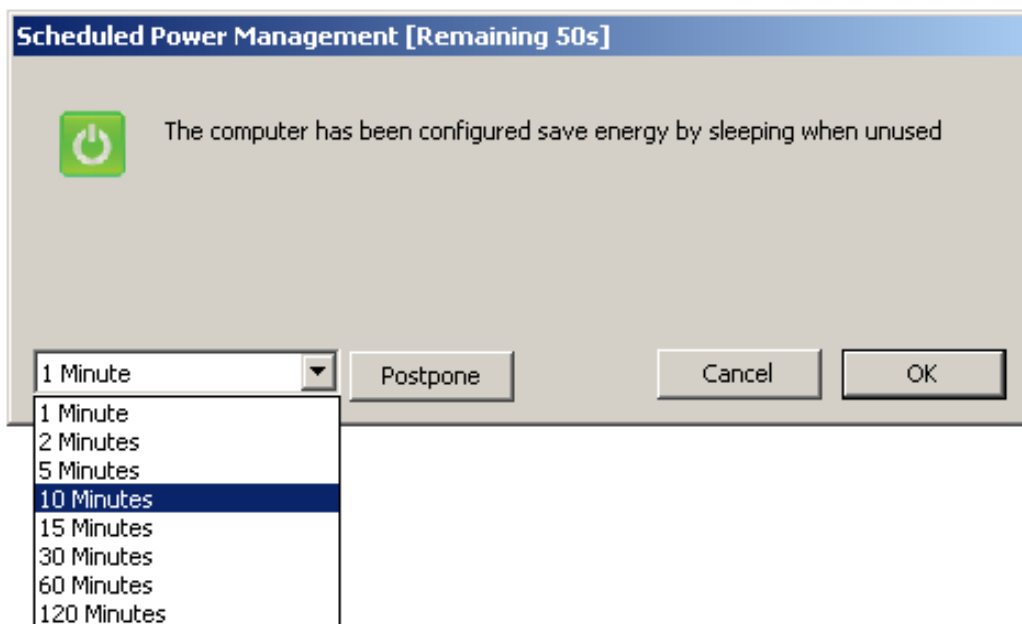
Scheduled Suspend / Reboot / Shutdown

The **Scheduled Suspend/Reboot/Shutdown** feature allows you to specify a scheduled time that the system will automatically enter a power saving state, reboot or shutdown. This approach is generally not as power efficient as idle based approaches but may be appropriate in classrooms or similar where a predictable outcome is desirable:

| Scheduled Shutdown/Sleep | Meaning |
|------------------------------|---|
| Days | The weekdays that the scheduled action will apply (typically All or Mon-Fri). This option may be extended by editing the ADM file. See appendix for further details. |
| Only Dates (optional) | The days of the month that the scheduled action will apply. This works in combination to the weekdays specified and may be left blank if not required. e.g. To sleep on the 1 st and 10 th of each month specify: 1, 10 and set days to "Everyday". |
| Time | The local time that the computer is scheduled to enter the specified state. Typically this value is set to be a few minutes after the closing of a public access area. |
| Mode | How to apply the specified action - This may be one of the following: <ol style="list-style-type: none"> 1. Allow user to cancel the action (the user is prompted) 2. Do not allow user cancel (the user is warned but cannot prevent the action) 3. Only if no user logged on (the action is ignored if a user is present) |
| Action | The action to take. This may be sleep, hibernate, reboot or power off. |
| Resume If Necessary | Allow system to wake from a low power state in order to perform another task or transition to another power state. This setting is typically used in environments where Sleep (S1-S3) is used during the daytime but at night additional energy saving is desired by changing to Hibernate (S4) or power off (S5). If this setting is enabled the system will wake from one state and immediately transition to the specified state. As with the scheduled wake feature this function depends upon the hardware support for scheduled wake-up. |
| Override | Allow scheduled event to be inhibited by other programs or settings. This option can be used to prevent the event from occurring when a protected program or file is present. |

| | |
|-------------------------|--|
| User Prompt | The message displayed to the user (if present) when the scheduled action runs |
| Prompt Timeout | The time that the message is displayed to the user. |
| Maximum Postpone | The maximum time that the user may postpone the scheduled action (if permitted). The available postponement time decreases with each postponement subject to the prompt timeout period. |

Tip: Some organisations have found that power saving can be maximized without sacrificing usability by combining sleep and hibernate. In such a configuration sleep is configured as the 'daytime' idle action with a relatively low timeout value (for example 10 minutes). This means that the system will frequently sleep but is available almost instantly should the user require it. The user experience with such a light sleep is very similar to that when only the monitor is turned off. When this is combined with scheduled hibernation during non-operating hours (night) and wake at the start of operating hours the user may not even notice that the system is using power saving.



Global Power Settings (Power buttons, lid switches etc.)

PowerMAN supports the following **Global Power Settings**. These apply to the workstation at all times regardless of which user is logged on:

| Global Power Settings | Meaning |
|-------------------------|---|
| Lid Open AC | The action to take, when running on AC power, when the computers lid (if present) is opened. Support for this feature may not be present on all hardware. |
| Lid Open DC | As above but applies when running on DC power |
| Power Button AC | The action to take, when running on AC power, when the power button is pressed. |
| Power Button DC | As above but applies when running on DC power |
| Sleep Button AC | The action to take, when running on AC power, when the sleep button (if present) is pressed. |
| Sleep Button DC | As above but applies when running on DC power |
| Lid Close AC | The action to take, when running on AC power, when the computers lid (if present) is shut. Support for this feature may not be present on all hardware. |
| Lid Close DC | As above but applies when running on DC power |
| Password on wake | Require a password when the computer wakes from sleep or hibernate. This should normally be enabled. |
| Show power meter | Show the power meter on the task bar. This policy should generally only be enabled for laptop computers. |
| Video Dim DC | Dim the screen when running on DC power. This policy is typically only supported by some laptop computers. |

Protected Objects (including maintenance windows)

PowerMAN allows various objects to be 'protected'. When a protected object is present power management may be inhibited. The following protected objects are supported:

| Protected Setting | Meaning |
|--|--|
| Protected Times (maintenance windows) | <p>Specifies a time window that power management will be disabled. Optionally the system may be configured to resume from a low-power state to enter the protected time period.</p> <p>A protected time may optionally be specified to only apply on certain days of the month. This works in combination to the weekdays specified and may be left blank if not required.</p> |

| | |
|----------------------------|---|
| | e.g. To apply on the 1st and 10th of each month specify: 1, 10 and set days to "Everyday" |
| Protected Computers | Specifies a list of computers where power management is disabled. This may be used to provide exceptions for certain computers within a policy group that generally implements power management. |
| Protect Computer | Protect any computer that this policy is deployed to. |
| Protected Programs | Specifies a list of programs that, when running, require the system to remain awake. Program names should be specified without a file extension. e.g. CMD and <i>not cmd.exe</i> |
| Protected Files | As above but applies to files. When a file in the protected list exists PowerMAN will ensure that the system remains awake. Files should be fully qualified and include a file extension. e.g. C:\CONDOR\ACTIVE.LOG |
| Protect Users | See: Distinct User Policies below |

The **Protected Server Service** option allows you to configure the client computer to remain awake (not idle) when the Windows Server service is running. This service is enabled in a default operating installation but is sometimes disabled by system administrators to increase system performance or security. In these cases it may only be enabled if it is specifically required for printer or file sharing. When this option is enabled, and the Server service is running, the system will not sleep, hibernate or shutdown as a result of a power policy.

| Protected Setting | Meaning |
|---------------------------------|---|
| Protected Server Service | When enabled and the Server Service is running, the system will not sleep, hibernate or shutdown. This option should normally be either not configured or disabled unless specifically required as incorrect configuration will result in increased energy consumption. This option has no effect if the Server Service is not running. Tip: The Server Service is used by Windows to provide access to your computer from other workstations. This setting may be ignored if the workstation does not share any printers or folders. |

Resume Configuration Feature

By design Windows will return to the previous low power state (sleep or hibernate) after few minutes if there is no user activity following an automatic resume. This feature is automatically disabled as soon as user activity resumes. On some systems application behaviour may interfere with this feature or it may be undesirable. For instance, this Windows feature can sometimes interfere with a scheduled Anti-virus scan.

PowerMAN's **Resume Configuration** feature allows this Windows feature to be inhibited where necessary:

| Resume Configuration Setting | Meaning |
|--|--|
| Inhibit re-suspend timeout | Specifies a period of time during which PowerMAN will prevent the system from returning to the previous low power state. If no user activity occurs during this period PowerMAN will subsequently allow the PC to return to the previous low power state. This process is terminated immediately upon any user activity |
| Activate Display * *This feature is not supported on some hardware platforms or graphics cards. | Allow the display to be turned on following an automatic system resume. |

Power Policy Enforcement / Anti-Insomnia Feature

PowerMAN supports a **Policy Enforcement / Anti-Insomnia** feature. This can be used to ensure that the specified idle action will occur and cannot be suppressed by Windows or another program. This is sometimes known as 'PC Insomnia' and is necessary on some systems where the installed software may periodically reset the Windows idle timer or otherwise prevent the system from idling.

| Policy Enforcement Settings | Meaning |
|------------------------------|---|
| Extra Timeout AC | The amount of time, in addition to the specified idle timeout after which the idle action will be forced. |
| Extra Timeout DC | As above but applies when running from battery power. |
| Managed policies only | Apply policy enforcement to managed (PowerMAN) policies only. If this setting is set to disabled policy enforcement will be applied to the active power scheme even if it was not created by PowerMAN. This is disabled by default. |
| No user policy only | Apply policy enforcement only to the 'No User' policy that applies when nobody is logged in. This is disabled by default. |

The policy enforcement feature is enabled by default with a grace period of 15 minutes. We recommend that this feature is not disabled.

Hardware Device Power Management Settings

PowerMAN allows the power management properties of some hardware devices to be configured centrally. This feature is intended to ease the transition to a power managed environment by ensuring hardware settings are consistent. Separate settings are provided for portable (laptop) and desktop computers. Portable computers are those with an internal batter. All of the following features become effective at the next reboot:

| Device Power Management Setting | Meaning |
|--|--|
| <p>Network interface power management</p> | <p>Specify power saving / wake mode for supported network interface devices. This may be used in preparation for a Wake-on-LAN (WoL) deployment or to disable WoL.</p> <p>The available options have the following meanings:</p> <p>Disable power management – No power saving enabled.</p> <p>Allow power saving modes – Allow device to enter low-power state</p> <p>Allow computer wake (any) – Allow any network packet to wake workstation (not recommended)</p> <p>Allow (WoL) computer wake (strict) – Allow only Wake-on-LAN packets to wake PC. This is the recommended setting.</p> <p>The 'Allow Wake (Any)' setting may cause occasional wake-up due to normal network traffic and should not be used on portable computers. This setting becomes effective on the next reboot. This feature is not supported on Windows 2000.</p> |
| <p>USB Hub power management (Selective Suspend)</p> | <p>Configure power saving mode for USB hubs. In some Microsoft documentation this feature is known as 'selective suspend'. Allowing USB hubs to enter a low-power state can decrease overall energy consumption. However, this may also prevent a device such as a keyboard, connected to the hub from being used to wake the workstation.</p> <p>NB: The principle purpose of this feature is to disable power management for USB hubs that manage a USB keyboard where the keyboard is used to wake the PC.</p> |
| <p>HID Keyboard / Mouse wake</p> | <p>Configure keyboard / mouse devices to wake the PC. In some cases this may also require a related BIOS settings change to operate.</p> <p>This feature is not available for legacy PS/2 devices.</p> |

| | |
|---|---|
| USB S3 Sleep / Wake (Windows XP/2003 only) | <p>Allow S3 sleep mode when USB devices are configure to wake the system. On some systems compatibility problems have been found with S3 mode when using USB devices.</p> <p>In some rare cases using this feature can result in system instability during suspend or resume if S3 is not fully supported. Please see http://support.microsoft.com/kb/841858.</p> <p>This is only supported on Windows XP/2003 and may not function for all hardware.</p> |
|---|---|

User Interface Settings



PowerMAN includes an optional user interface feature. This makes some convenient options available to users via an icon in the System Notification (Tray) area.

The user interface allows users to interact with the power management strategy and, within limits, customise it for their own requirements. Experience has shown that this can greatly increase user acceptance of a new power managed environment.

The user interface may be enabled only for certain users and each feature within the interface may be configured via the policy settings below:









| User Interface Setting | Meaning |
|------------------------|---|
| Display GUI | Enables sdisplay of the user interface icon. If necessary the icon can be enabled without enabling any of the other UI features. |
| Help Page | The URL of the power management help page. This can be the default page provided by Data Synergy or a custom page specific to your organisation. To disable this feature blank the page link. The default page is: http://www.datasynergy.co.uk/help/powermanhelp52.aspx |
| Allow exit | Permit user to exit the UI |
| Allow opt-out | Configures the opt-out menu option. When enabled this allows a user to opt-out of the centrally managed power management strategy and self-configure using the standard Windows Control Panel applet (powercfg.cpl). When this feature is enabled the Control Panel power management applet can be opened by double clicking on the PowerMAN Icon We recommend that this feature is only enabled for users that strictly require it. |

| | |
|--|---|
| <p>Allow keep awake</p> | <p>Configures the keep awake feature. When enabled by the user this feature will prevent the computer from entering a low power state.</p> <p>We recommend that this feature is only enabled for users that strictly require it.</p> |
| <p>Personal Statistics Link</p> | <p>Enables display of the personal statistics menu option. When selected this link will open the PowerMAN statistics webpage for the current workstation.</p> <p>This option is intended for computers that are predominately used by a single user and should not be enabled for shared workstations.</p> |

The majority of user interface settings are available as both per-computer and per-user settings. If a user policy is specified it takes precedence over the computer policy. The behaviour of the user interface feature may be further modified using the miscellaneous settings.

PowerMAN User Interface Icon

The PowerMAN icon displays the current power management state. In some cases the icon may be overlaid with an additional symbol as indicated below:

| Meaning / Icon | | Keep awake enabled | Out-out enabled | Forced awake (third-party app) |
|---|---|---|--|---|
| Managed Plan Active |  |  |  |  |
| No managed plan / Managed plan not active |  |  |  |  |

The user interface is designed to place minimal requirements upon the workstation. For this reason it only updates every few seconds. There may be a small delay between changing power management state and the icon changing. This is normal.

Miscellaneous Power Settings

PowerMAN provides several miscellaneous configuration features under the miscellaneous section. These are generally minor features or features that influence the way other policies are interpreted.

Separate DC power policy settings are provided for systems, such as laptop computers, that run on both AC and DC power. Typically the DC policy will be stricter to enhance battery life. For desktop computers these values should be set to the same as the AC policy. The DC settings are ignored unless the **Separate DC Settings** feature is enabled:

| Setting | Meaning |
|-----------------------------|---|
| Separate DC Settings | Allow separate DC settings to be configured. When disabled any DC settings are ignored. This option should be set to not-configured or disabled except when configuring PowerMAN for use with portable computers. If separate DC settings are used care should be taken to ensure they are compatible with the AC settings. |

The **Hibernate (Suspend to disk)** option allows you to remotely enable the Hibernate (S4) power saving state. This is the same as selecting the checkbox on the local computers Power Management Control Panel applet. As noted elsewhere S4 is the most effective power saving state available that still retains the users' (logon) session state.

| Setting | Meaning |
|------------------------------------|--|
| Hibernate (Suspend to disk) | Enable support for the hibernate (S4) power saving option. This is the same as ticking the hibernate option in the local control panel applet. If hibernate is not enabled attempts to hibernate will normally result in Suspend To RAM (S1-S3) instead. |

PowerMAN allows the various built-in Windows power management tools to be hidden. These settings are available separately, using several different policies provided by Microsoft, and is therefore provided to simplify the process with a single configuration option.

| Setting | Meaning |
|------------------------------------|--|
| Hide Power Management Tools | Hide the Power Management control panel applet and the Screen Saver configuration tab of the display properties applet. This feature is only available in Windows XP/2003. |

Remember: Only Power Users and Local Administrators can usually change the computer power settings. PowerMAN allows you to specify settings for all users regardless of their access level. The option to hide the built-in Windows tools is designed to prevent casual tampering. It will not prevent a knowledgeable Power User (or above) from loading the Power Management Control Panel applet (Powercfg.cpl) manually. This should not be a significant concern as any configuration changes a user does make will be erased the next PowerMAN updates (usually every 10 minutes). If users really require the ability to override you Administrator defined configuration you should consider either applying a separate user policy OR allowing the user access to the opt-out feature via the user interface.

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The **Ignore User Power Policies** option allows you to disable the separate user specific power settings on a per-machine basis. This option may be useful where you are using a combination of default and specific user settings but on certain workstations you want the default settings to apply regardless.

| Setting | Meaning |
|-----------------------------------|---|
| Ignore User Power Policies | <p>Ignore any user specific power settings (configured in a user-based policy).</p> <p>When a user is logged in the default settings will apply and the user's PowerMAN settings ignored. When no user is logged in the No User settings, if present, will apply.</p> <p>This setting may be used to override the specific user settings on a per-computer basis. This is ideal for shared systems or computers in a public area.</p> |

The **Ignore User Opt-out** feature instructs PowerMAN to ignore the user opt-out option available, at the administrator's discretion, to users via the user interface icon.

| Setting | Meaning |
|----------------------------|---|
| Ignore User opt-out | Ignore user opt-out configuration. This option also removes the user opt-out option from the user interface menu. |

The **Discard User Opt-out** and **Discard User Keep Awake** features instruct PowerMAN to discard any user opt-out or keep awake setting upon logon or reboot. This may be used to discourage persistent abuse of these features by users to workaround the intended power management scenario:

| Setting | Meaning |
|--------------------------------|---|
| Discard User Opt-out | Discard user opt-out selection upon logout / reboot. |
| Discard User Keep Awake | Discard user keep awake selection upon logout / reboot. |

Windows Vista and later allow the hardware wake-up timer to be disabled. This decreases power consumption in a low-power state by disabling automatic system resume. If system resume is not required then these timers may be safely disabled. Conversely, if wake-up is desired then this feature should be enabled. This feature has no effect on legacy operating systems prior to Windows Vista:

| Setting | Meaning |
|--------------------------------|---|
| Allow wake-up timers AC | Globally enable/disable hardware wake-up timers on AC power |
| Allow wake-up timers DC | As above when running on battery power. |

Custom Actions

PowerMAN allows specific custom actions to be performed during system suspend and resume. These actions can be run for the entire system or per-user. Custom actions may be used to implement workarounds for undesirable application behaviour in a power managed environment or to notify a third-party component that suspend/resume is occurring.

Two action types are currently supported:

1. **CLOSEWINDOW** – Close specific application window(s) or dialog(s). This action supports wildcards.
2. **RUNPROG** and **RUNHIDDEN** – Launch application / script

The command syntax and operation of custom actions is further explained in the Appendix at the end of this document.

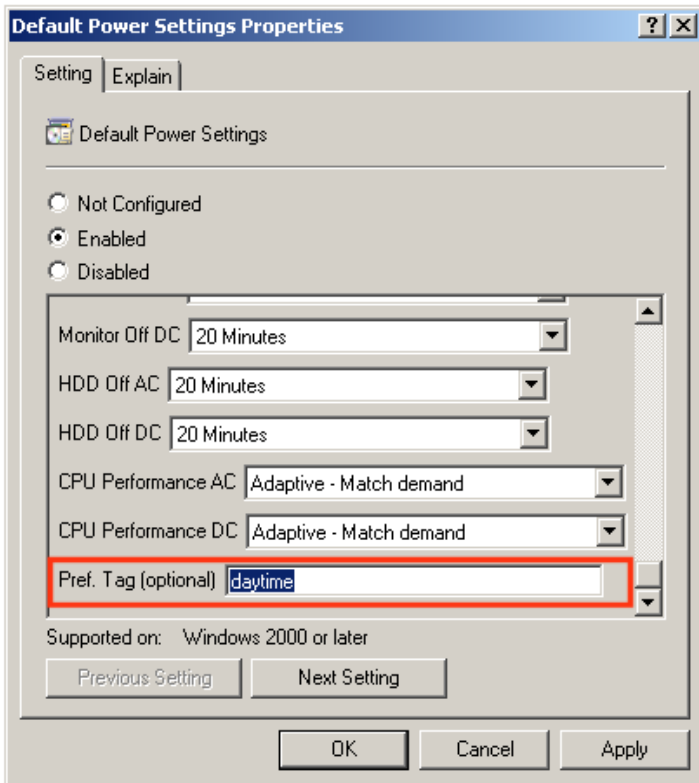
Policy Preferences Feature (Advanced)

The PowerMAN Policy Preferences feature allows a menu of power policies to be assembled and periodically displayed to the user for self-selection. This may be used to greatly increase user participation in an enterprise-wide power management strategy whilst strictly controlling the options available. We recommend that this feature is only used by administrators already familiar with basic PowerMAN configuration.

Tip: This feature may also be leveraged in non-directory environments to deploy a 'pool' of power policies and to selectively activate the desired policies using client-side logic. This may be achieved by using the **Policy preset** or **Registry defined for system** modes.

The preferences feature may be combined with the start/end policy times and default, no user/specific user settings to create powerful, multi-layered policies. The preferences system also provides for a fallback to an alternative policy if no preference policy is applicable. It is good practice to provide a fallback policy. This will ensure that a centrally defined policy always applies.

Tip: Multiple Default, No User and User-specific policies may be tagged with the same tag. The normal PowerMAN rules apply and the first applicable policy will apply. This may be used to implement a linked collection of policies that apply at different times and in different situations



The preferences feature is implemented using a **Preference Tag** that may be assigned to PowerMAN idle policies. The tag is a short alpha-numeric string and is not displayed to users. This tag associates groups of related policy settings together.

The preference tag field should be left blank when not required.

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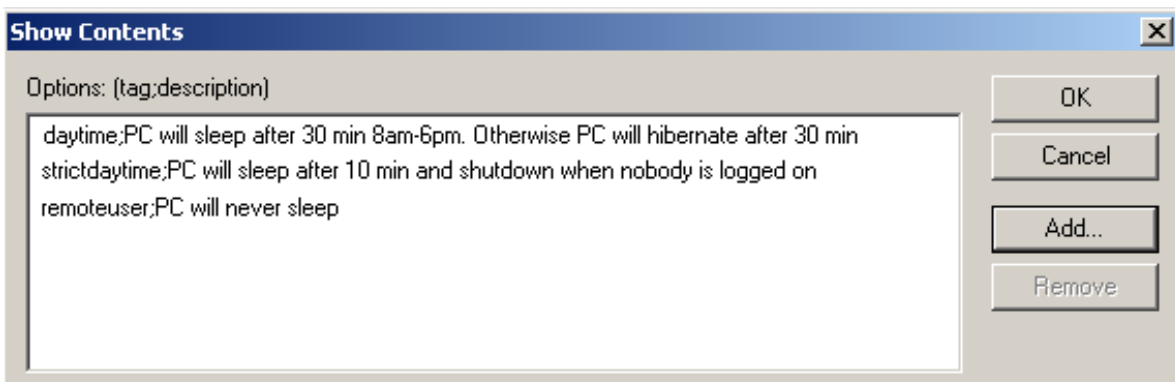
The following basic settings are supported:

| Policy Preferences Configuration | Meaning |
|----------------------------------|--|
| Mode | <p>Defines the operating mode of the policy preferences feature.</p> <p>The available options have the following meanings:</p> <p>User self selection – The user is prompted to self-select from the available options. The selection only applies whilst the user is logged on.</p> <p>User selection for system – The user is prompted to self-select from the available options. The selection applies to the workstation regardless of who is logged on until a subsequent selection.</p> <p>Policy preset – No user interface is displayed. The selection is defined by a policy setting.</p> <p>Registry defined for system – No user interface is displayed. The selection is defined by a registry setting. This feature allows the selection to be made by third-party logic or a script.</p> |
| Fall-back to | <p>Defines the PowerMAN behavior if the current policy preference selection is not available. The available options have the following meanings:</p> <p>Any applicable policy – Use first applicable policy regardless of policy tag</p> <p>None. Preference policy only – Only use tagged policies. If no applicable tagged policy available do nothing.</p> <p>Non-preference policies only – Ignore tagged policies and use first applicable non-tagged policy.</p> |

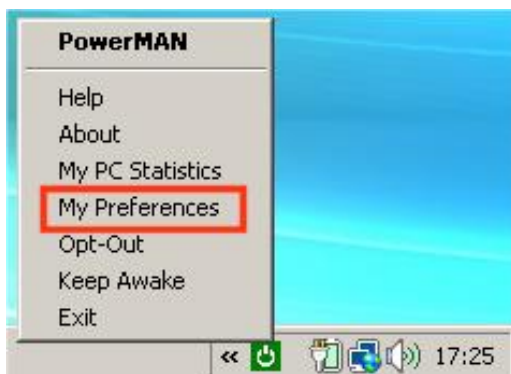
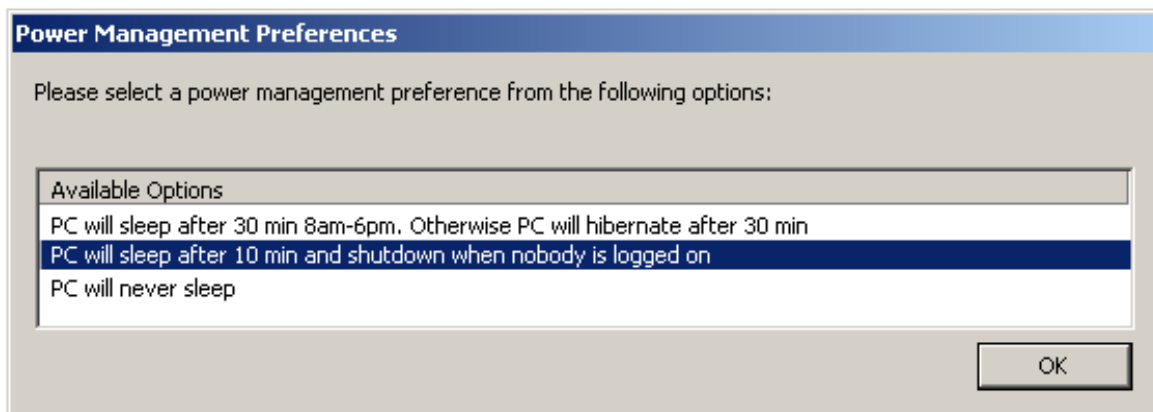
The Policy Preferences selection menu is displayed whenever a user selection is required. This can be because the interface has not been displayed for a period of time or because the previous selection is no longer available. The following settings are available to configure this feature:

| Policy Preferences User Interface Setting | Meaning |
|---|--|
| Display Interface | Defines how often the selection menu is displayed. |
| User Prompt | Defines the message displayed to the user |
| Options (tag;description) | Define a list of options to display. These are in tag;description format where the tag is available within the pool of available policies. |

For example, the Options (tag;description) configuration could be:



PowerMAN will only display menu options that are available. Therefore, if no options are actually available the policies the menu will not be displayed. The menu is displayed when the user next logs on:



The menu may also be displayed at any time by selecting the option from the PowerMAN icon.

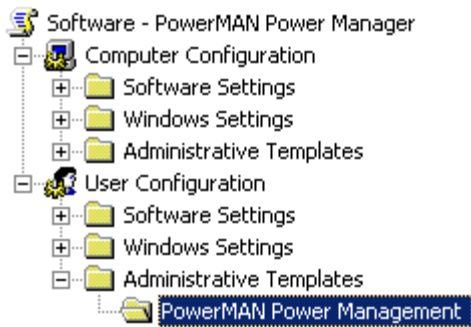
Advanced Settings

Finally, PowerMAN supports the following **Advanced Options**. These are intended for resolving configuration options and should normally be used only under the supervision of PowerMAN Technical Support.

| Advanced Settings | Meaning |
|--|--|
| Ignore Active Flag | When enabled this option will ignore other related tools (such as the legacy PowerCONFIG tool and PowerSTART) and protected objects. This means that non-user activity will not be reported and will be counted as idle time. Use this option to enforce a policy regardless of these tools. |
| Ignore phantom activity | Ignore phantom (e.g. typically optical) mouse input when no user logged on. This policy is enabled by default and provides a workaround for problem mice when no user is present. |
| UI Ignore recent events | Disable UI notification of recent power management events. This prevents display of the orange status icon. |
| Default Idle Sensitivity% AC | The level of sensitivity applied by Windows to detect system idle when running on AC (mains) power. On systems that fail to correctly idle it may be necessary to lower this (see notes below). The recommended value is 5%. This value may be 5-95%. |
| Default Idle Sensitivity% DC | As above for DC (battery) power source |
| GUI refresh (ms) | The frequency that the PowerMAN UI Icon updates. The default is 10 seconds. |
| Upload timeout (ms) | The period that PowerMAN will wait for a response from the PowerMAN server before aborting a data upload. The default is 10 seconds. |
| Maximum upload retry delay (secs) | The maximum period that PowerMAN will wait before re-trying to repeat a failed upload. The default is 300 seconds (5 minutes) |
| Regenerate missing policies | Some third-party utilities have been observed to remove all legacy Windows power policies (in Windows 2000, XP and 2003). In this situation the Windows power management sub-system refuses to operate and prevents new policies (including PowerMAN) from being configured. This setting, which is enabled by default, works around this extreme situation by re-generating the default OS policies if they are completely missing. |
| Remove broken policies | Legacy Windows power policies (in Windows 2000, XP and 2003) are stored in both the HKLM and HKCU portions of the Registry. Sometimes these can become inconsistent. This can happen in environments with roaming profiles or where other third-party power management tools have been used. In some cases these broken policies may prevent PowerMAN from operating correctly. When enabled this feature allows PowerMAN to |

| | |
|--|---|
| | remove these damaged policies. This is harmless and is enabled by default. |
| Fix inconsistent settings | By default PowerMAN will try to resolve configuration problems by using the closest policy possible to that configured. This may be necessary because of inconsistent settings or missing hardware support for the chosen configuration. This feature is enabled by default. Care should be exercised when disabling this feature as it may expose problems with existing settings. |
| Always user internal shutdown timer | Windows 2000, XP and 2003 directly support system shutdown on idle. On later operating systems this feature is implemented internally by PowerMAN. In some cases it may be desirable to use the internal PowerMAN timer to workaround problems with the Windows timer. An example of this is when using shutdown scripts which are ignored by the Windows internal shutdown timer. This feature is disabled by default. |
| Default Enforcement | <p>The policy enforcement (anti-insomnia) feature is enabled by default with a timeout of 15 minutes. This setting may be used to disable this feature. This should not normally be necessary.</p> <p>Policy enforcement may also be disabled by explicitly setting the enforcement timeout to zero.</p> |
| Offline network detection | By default PowerMAN will attempt to upload outstanding data every few hours. In some infrequently connected environments this may result in a delay before PowerMAN reporting data is available on a server. PowerMAN includes a built-in offline network detector that will detect infrequently connected computers and attempt an immediate upload if a network connection is detected. This feature is enabled by default. |
| WTS Started check | PowerMAN requires the WTS service to operate on Windows XP/2003. In some rare cases this service may be slow starting. This setting may be used to disable the WTS start-up checks within PowerMAN. This feature should be used under the instruction of Technical Support. |
| Delay PowerMAN Activity | In some systems it can be desirable to delay PowerMAN start-up until after the system is fully running. This setting defines a time period that PowerMAN will pause before starting. |
| Event Logging | The amount of information reported in the Event Log. This setting may be changed to increase or reduce the amount of information reported. |
| Event log size (MB) | The size of the power management event log. |

Distinct User Power Policies



All of the PowerMAN settings described above are computer policies that apply to the entire workstation. When using Group Policy they are configured within the **Computer Configuration** branch of the Group Policy Object Editor.

These policies apply to all users and are the simplest way to quickly implement an effective power management policy.

In some cases it may be necessary to apply **additional** policy settings for specific users or groups of users.

Tip: PowerMAN can be very effectively implemented **without** creating any separate user based policies. These are only necessary when specific users need to deviate from the standard policy and should be the exception rather than the rule. If this approach is taken please remember to continue to configure No User (logon prompt) and Default (everyone else) policies to ensure you achieve the most effective coverage. **The user policy should always be created using a separate Group Policy Object to that used to install and configure the PowerMAN service.**

To create a separate user policy you must create a separate Group Policy Object for the user settings. This is necessary because the normal policy is applied on a per-computer basis. To perform this configuration:

1. Open the **Group Policy Management Console (GMPC)**
2. Locate the Organisational Unit (OU) to which you wish the initial policy to apply
3. Right click the OU and select **Create and Link a GPO here**
4. Enter a name of the new policy and click **Ok**. The example creates a policy called **Software – PowerMAN Power Manager**
5. Select the newly created policy, right click and select **Edit**
6. The Group Policy Object Editor should open
7. Navigate to the User Configuration section and expand the **Administrative Templates** section
8. Right click and select **Add/Remote Templates**
9. Click **Add** and locate the PowerMAN5.adm file supplied. When this is completed click Close. It may be helpful to remove the other administrative templates present using the Remove button. These are not required for PowerMAN.
10. Configure the **User Power Settings** using the same method as outlined above for the Default Settings

Getting the most from PowerMAN

Baseline existing environment

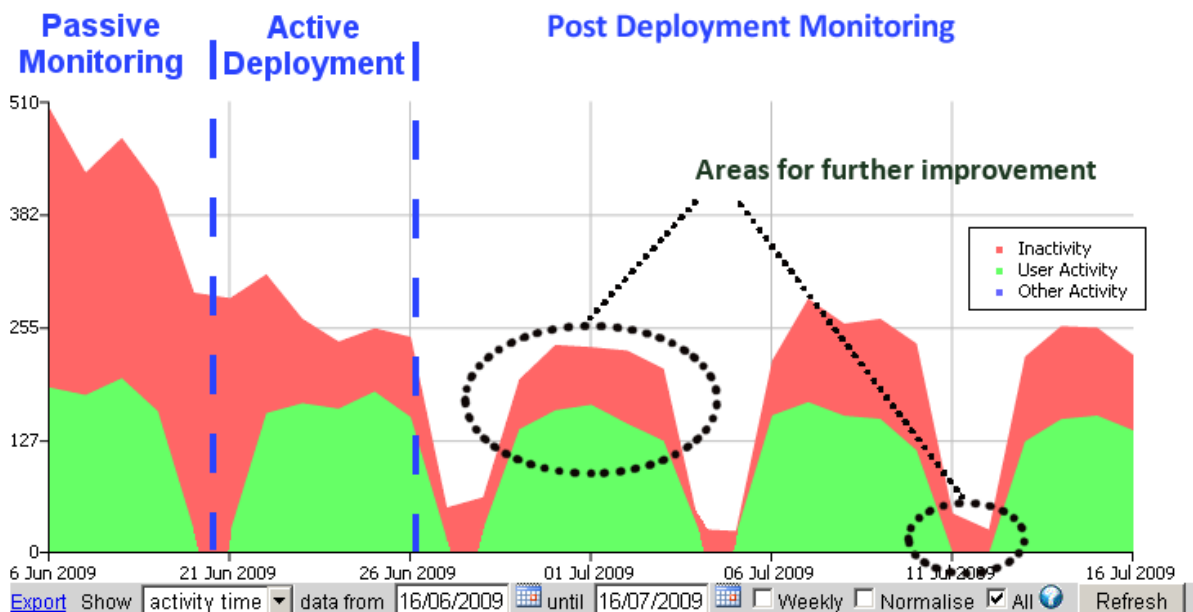
PowerMAN will work best if the existing environment is measured before any power management is attempted. We therefore recommend that the software is used for monitoring only during the first few weeks of operation. After a consistent pattern has emerged this information may then be used to inform decisions about which power management strategy to use and then quantify the effect of the chosen strategy.

The software offers many different ways to manage power effectively. The following section explains best practices and provides some useful tips on getting the most from PowerMAN.

Typical deployment phases

A typical deployment is divided into three distinct phases:

- An initial period of **passive monitoring**. This allows a baseline usage profile to be established
- Deployment of an **active power policy**. This is designed to reduce energy from the established baseline. Often the specific settings used are chosen based upon both the results of the monitoring phase and existing knowledge about the usage pattern and user requirements
- A **post deployment monitoring** phase. In this phase the power policy is monitored and areas for possible further improvement may be identified.



Idle or schedule-based power management?

PowerMAN allows both idle (timeout driven) and scheduled power management actions to be configured. Each has advantages and in some cases they may be used most productively together:

- **Idle Strategy** – The Default, No User and specific user policies allow an idle timeout to be defined. This is very similar to the basic configuration available in the Windows Control Panel Power applet. A timeout strategy allows each computer to respond dynamically to its environment. This will normally maximize any power savings but does mean that each computer will behave independently. This may be unsuitable for some environments such as timetabled rooms in schools.
- **Scheduled Strategy** – The scheduled shutdown / sleep / hibernate policy allows a specific action to occur at a specific time. This is ideal for environments with a predictable usage pattern or where independent computer behaviour may be disruptive. Unless computer utilisation is very high it is unlikely that a scheduled strategy alone will achieve the savings possible from an idle-based approach.
- **Combined Strategy** – In some environments a combination of the two strategies may be ideal. A common approach is to use a light sleep timeout driven strategy for 'daytime' periods. This has the advantage of a fast resume time and minimal disruption. This can be complemented by a nightly full shutdown or hibernation strategy.

Complementary PowerMAN features

Consider using the following additional options to improve results:

- **Default Policy** – The power policy that applies at all times to all users unless a more specific policy is applicable. This policy allows a common standard to be quickly implemented
- **No User Policy** – It is often possible to use a more aggressive power management strategy when nobody is logged on. PowerMAN allows a distinct policy to be defined for this situation.
- **Logout Policy** – Sometime operating environments (such as school or university computer rooms) have a very high turn-over of users. It would be inappropriate to enable an idle policy, whilst a user was logged on, in such environments as this may result in a computer being locked for subsequent users.

A logout policy can be used in combination with the No User policy to ensure that the user is not logged on before the appropriate idle action occurs. This approach can also benefit usability because it allows Sleep or Hibernate to be configured as the idle action when no user is logged on which means the system can become available again to the next user in a reduced time.

- **Policy Enforcement** – Sometimes the installed software may prevent the computer from becoming idle. As noted elsewhere in the documentation there are numerous legitimate reasons for this (such as a Microsoft Office PowerPoint slide show) where this is desirable. Unfortunately this can also happen when not intended and can result a significant additional amount of energy waste. If this appears to happen the policy enforcement feature may be used to configure an **additional** time, after the last user input, after which the idle action will be forced. Policy enforcement is enabled by default in PowerMAN v5.2 and later.
- **Scheduled Power Management** – Alternatively, the scheduled shutdown/sleep/hibernate policy may be used as a 'catch-all' policy to ensure that systems are shutdown or configured

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to use less energy at certain times of the day. This approach can prove very effective where the usage pattern is predictable.

- **Policy Preferences Feature** – This feature allows users to participate in the power management strategy by selecting a policy from a menu provided by the system administrator. Whilst the options available are controlled by the system administrator this approach can increase user acceptance by offering users some degree of autonomy.

Maximizing Savings

Each organisation has specific operating requirements that will require tailored power management settings. Often the perceived drawbacks of using active power management can be overcome by both a careful deployment and by keeping the users informed. The following tips may help maximize savings:

1. An effective idle-based strategy will usually have the greatest effect on energy consumption. The savings available greatly exceed those possible from display, hard disk power management or scheduled strategies.
2. The display and hard disk settings may be used to further reduce energy consumption without risking the user's session. These should generally always be enabled.
3. Similarly the CPU performance settings can be used to reduce energy consumption with minimal impact on users. Typically these should be set to 'Adaptive' when a user is present and 'Degraded' when no user is present.
4. Screen savers consume energy. Consider turning the monitor off rather than enabling a screen saver.
5. Most modern programs fully support sleep or hibernate. These may be used to save energy whilst preserving the user session and any open documents. Sleep and hibernate are most appropriate when the PC is used by the same long-term user.
6. When the computer is regularly used by many users (for instance in a hot desk or public access area) sleep or hibernate are rarely appropriate policies for when the user is logged on. This because both lock the workstation for subsequent users. Instead consider using a logout policy to prevent the system being hogged by an absent user. Typically it can be quite simple to determine a suitable timeout after which the user is assumed to have 'abandoned' the computer.
7. The power settings appropriate when a user is logged on may be very different from those appropriate when no user is logged on. PowerMAN allows separate user and 'No User' policies to be easily defined. Ideally a power policy should be configured in both situations (even if the user policy doesn't implement an idle action it can still save significant energy by turning the monitor off or logging the user out after the specified period).
8. Power off does not need to be the default action – hibernate or sleep can be used as idle actions when no user is logged on to allow the next user to rapidly logon and become active.
9. Similarly PowerMAN can resume the PC from one sleep state to transition to another. This can be effectively used to use a light sleep (S1-S3) during the daytime when the system is idle but transition to power-off or hibernate (S4) at night time.

Practical tips for an effective PowerMAN deployment

As you move towards using PowerMAN for actual power management the following tips may help with project planning:

1. Think about your users and their usage pattern. Are your user-computer relationships persistent? Will the same user use the PC next time? If the same user will be the next person to use the PC then using hibernate / sleep may be ideal.
2. If the users change frequently then hibernate or sleep may result in the computer being locked for the next user. In this case a forced logout may be a good approach. When the user has been logged out you can then implement your chosen power management strategy using a 'No User' policy.
3. PowerMAN offers several different policy management policies. Most organisations implement a standard 'Default' policy. If appropriate you may also wish to implement a 'No User' policy for when nobody is logged on. This is a good opportunity to use full power-off (shutdown) when nobody is logged on.
4. Idle (timeout) strategies generally save more energy because they allow each computer to respond independently to its environment. This works well in some environments but may be unacceptable in others with a more rigid operating schedule (for instance school classrooms).
5. Alternatively you may like to use a scheduled strategy (scheduled hibernate etc.) as your primary management mechanism. Depending upon your environment this may be a cruder approach but have the advantage of being consistent on every PC and therefore more suitable for your users.
6. Some organisations use a mixture of Idle and Scheduled approaches. This can work very well with the 'daytime' idle timeout being used for a 'light' sleep and the night-time scheduled shutdown being used to clean-up and maximize savings over night.
7. Whatever approach you use please remember that PowerMAN will work most consistently if you:
 - **Baseline the environment before implementing actual power management** – This will allow the effect of the remedial action to be quantifiably measured.
 - **Always define a Default idle policy** - even if it is configured to do nothing
 - **Always define a Global policy for hardware buttons etc.** - even if the configuration is trivial this will ensure consistency. This step is particularly useful on Windows XP where pre-existing power management configuration may sometimes cause a conflict.
 - Remember to **enable hibernate** if you plan to use this power saving mode
 - **Enable 'Policy Enforcement'** to ensure consistent application on PCs suffering from PC Insomnia.

Common Scenarios

The following table explains two common scenarios and suggested PowerMAN management strategies:

| Scenario | Description | Suggested Strategy |
|--|---|---|
| Office / Workplace Exclusive PC access User dedicated PC | <p>Same user uses PC every day. Locked workstations are acceptable.</p> <p>Some users may leave systems on to avoid start-up delay and preserve work or allow remote access</p> | <p>Sleep systems when not in use. This preserves system state ready for later access whilst permitting fast resume.</p> <p>Hibernate or power-off systems when no user is logged on. This will increase energy saving for workstations that may remain unused for some time.</p> <p>Consider enabling scheduled wake-up for start of working day. Configure system for remote wake if remote access required.</p> |
| Public access area or Hot desk office Non-exclusive access Non-dedicated PC | <p>Different user uses PC every session. Locked workstations are not acceptable.</p> <p>Users frequently change and users understand the need to save open documents before leaving a workstation unattended.</p> <p>No requirement for remote access</p> | <p>Log out inactive workstations and then use a 'No User' policy to sleep/hibernate the PC ready for the next user. This will minimize start-up delays.</p> <p>If appropriate use scheduled wake-up to match user patterns.</p> |

Example Settings

As noted above the recommend approach following an initial deployment is to wait several weeks and monitor the site. This will give you a baseline against which to judge the various policies you may consider applying.

It works best to start gradually and apply policies over several weeks monitoring the energy saved and any impact on users. The settings may be edited using the Group Policy Object Editor described above (access this through the Group Policy Management Console).

A typical site scenario would proceed as follows:

- Deploy and determine baseline usage. This may typically take several weeks
- Apply some relatively non-intrusive settings. Some examples could be:

No User Power Settings (no user logged on)

NB: It is safe to turn off the PC when nobody is logged on

| | |
|------------------------|------------|
| Idle AC | Power Off |
| Idle Timeout AC | 15 minutes |
| Idle DC | Power Off |
| Idle Timeout DC | 15 minutes |
| Monitor Off AC | 5 minutes |
| Monitor Off DC | 5 minutes |
| HDD Off AC | 2 minutes |
| HDD Off DC | 2 minutes |

Default Power Settings (Apply unless another more specific policy is configured)

| | |
|--------------------------|------------|
| Logout Timeout AC | Disabled |
| Logout Timeout DC | Disabled |
| Idle AC | Do nothing |
| Idle Timeout AC | NA |
| Idle DC | Do nothing |
| Idle Timeout DC | NA |
| Monitor Off AC | 10 minutes |
| Monitor Off DC | 10 minutes |
| HDD Off AC | Do nothing |
| HDD Off DC | Do nothing |

- Enable policy enforcement (anti-insomnia). This will ensure that selected power settings operate as intended and are not interrupted by application behaviour. The enforcement feature allows a 'grace' period to be defined. After this additional time has expired PowerMAN enforces the selected power management behaviour:

| | |
|-------------------------|-----------|
| Extra Timeout AC | 5 minutes |
| Extra Timeout DC | 5 minutes |

- Remember to ensure hibernate is enabled if this power management is to be used. The simplest way to do this to use the PowerMAN setting:

| | |
|------------------------------------|---------|
| Hibernate (Suspend to disk) | Enabled |
|------------------------------------|---------|

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- After allowing a period to establish the effectiveness of these settings you may wish to go further. Typically the most gains can be made by reducing the time allowed before a computer turns off or hibernates:

Default Power Settings (Apply to all users)

| | |
|--------------------------|------------|
| Logout Timeout AC | Disabled |
| Logout Timeout DC | Disabled |
| Idle AC | Hibernate |
| Idle Timeout AC | 15 minutes |
| Idle DC | Hibernate |
| Idle Timeout DC | 15 minutes |
| Monitor Off AC | 5 minutes |
| Monitor Off DC | 5 minutes |
| HDD Off AC | 5 minutes |
| HDD Off DC | 5 minutes |

- Follow-up the deployment to ensure that the policy is working as desired. This can easily be achieved by monitoring the reported power statistics.

Excluding Specific Computers via a protected 'marker' file (Alternative method)

Normally it is possible to apply the same power management configuration to each computer within an organisational unit (OU) and use a separate OU for each logical power policy. However, sometimes this may not be desirable or it may not be practical to re-arrange the OUs to match the required power scheme. **The protected computers feature may normally be used to exclude specific computers.**

In some cases it may be desirable to exclude a computer based upon the presence of special 'marker' file. In this scenario the Protected Files feature may be used to exclude specific computers.

To use this procedure proceed as follows:

1. Create an empty text file which matches the computer name (or a global name if appropriate). One way to do this is to use a computer start-up script to execute the following batch file:

```
echo %computername% > c:\%computername%.txt
```

2. Use the Protected Files feature to exclude the `c:\%computername%.txt` file. For instance the following settings would exclude three computers:

```
c:\CriticalPC.txt  
c:\OfficePC.txt  
c:\FaxServer.txt
```

The following Microsoft document provides further information on computer start-up scripts:

[http://technet.microsoft.com/en-us/library/cc779329\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc779329(WS.10).aspx)

Alternatively, Group Policy itself may be used to exclude certain computers using Security Filtering. This is explained in the following Microsoft article and related discussion:

[http://technet.microsoft.com/en-us/library/cc781988\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc781988(WS.10).aspx)
<http://adisfun.blogspot.com/2009/04/security-filtering-and-group-policy.html>

Viewing PowerMAN statistics

To view the statistics for a site visit the following URL adding the appropriate Site GUID value (this is the value created when PowerMAN is deployed). For instance for the site {bf4c090c-9d22-4c82-8869-b63497040d01} the URL would be:

<http://www.pmstats.org:443/SiteSummary.aspx?SiteGUID={bf4c090c-9d22-4c82-8869-b63497040d01}>

Calculating actual energy consumption

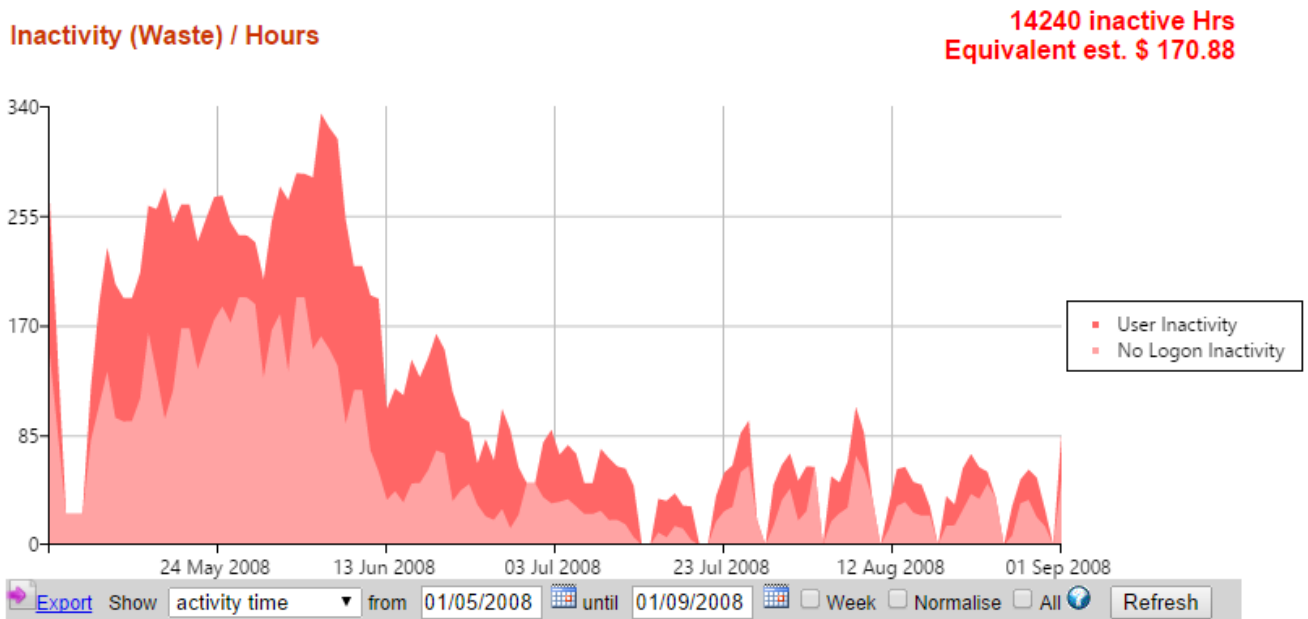
Due to the nature of standard PC hardware it is not possible to calculate an exact amount of energy (in watts) for each PC. This is because the standard PC architecture does not provide a standard method for measuring this. Therefore PowerMAN measures the following key factors:

- Cumulative time the computer is turned on
- Cumulative time the computer is in active use

From this information it is simple to calculate the time the computer was **not being used**. This is expressed as a number of hours 'idle'. This figure is directly proportional to amount of energy being wasted.

PowerMAN also measure other power related factors such as: The amount of time the hard disk is spun down, the monitor off, the computer was artificially prevented from sleeping by user configuration etc. In future revisions of the reporting software this information will be included giving a more detailed picture of the power consumption profile.

The Site Summary graph gives a fast, visual, indication of the amount of waste. Over a number of weeks progressive increases in the amount of power management can significantly reduce the amount (and cost) of waste.



Example: A typical PC consumes 150W. This is equivalent to 0.15kWh. Therefore, for a medium sized site of 350 computers, where the total site wasted hours for a week is 47040, and the cost of the electricity \$0.15 per kWh the calculation would be:

$$0.15 \text{ kWh} \times 47040 \text{ hours/week} \times \$0.15 / \text{kWh} = \$705.60 \text{ per week}$$

This is equivalent to a yearly cost of over \$36,000.

A useful **rule of thumb** is that office based computers are used 25% of the time (40 hours per week). If the computers are not shutdown at other times the waste period is up to 75%. With suitable configuration PowerMAN can virtually eliminate this waste.

How PowerMAN Works

PowerMAN installs a service application POWERMAN.EXE on each computer. The service spends the vast **majority of the time in an inert state** and therefore does not have any measurable impact on system performance. Periodically (every 5-10 minutes) the service checks the current status of the computer. This process only takes a fraction of a second.

During each cycle the program:

- Determines if the system has recently been accessed by a user
- Checks for the managed power scheme ('Managed policy for [username]')
- Creates the power scheme if necessary
- Updates the scheme settings according to the administrator configuration

PowerMAN uses the built-in power management features of Microsoft Windows wherever possible. This is why the current PowerMAN settings can be viewed through the standard Control Panel tools. This approach means that PowerMAN works alongside Windows wherever possible and allows the software to achieve maximum software compatibility. PowerMAN does implement some features (such as policy enforcement and user logout) internally. This is necessary because these features are not available in Windows.

PowerMAN is fully capable of configuring the power management settings for users who are not permitted, themselves, perform this action. Unlike most other solutions for power management this is achieved without lower any of the security safeguards build into the operating system. In addition PowerMAN provides finer control not normally available including:

- Default power policy
- Distinct policy for when no user is logged on
- Separate policy per user (if required)
- Multiple, time-bound, policies
- Multiple scheduled wake, shutdown, reboot sleep and hibernate policies
- Policy 'enforcement' to overcome PC 'insomnia' issues
- User override (for permitted users)
- Protection for specific programs or files from power management
- Customisable maintenance windows
- Full management reporting

PowerMAN is invisible to users and is active less than 1 second every hour.

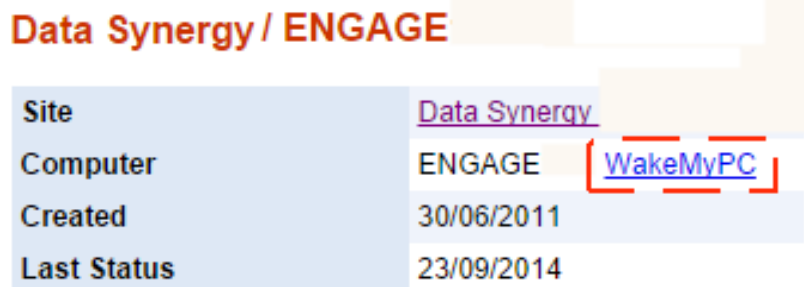
Additional PowerMAN Features

WakeMyPC - External PC wake-up gateway

PowerMAN includes the facility to integrate with **Data Synergy's WakeMyPC product**. This allows any computer within a managed site to be woken on demand. This may be used by a remote worker or Technical Support to activate the workstation when it is powered off.

This feature is achieved by using the Wake-On-LAN (WoL) feature present in most modern computers. To wake a suitably configured PC a WakeMyPC gateway must be present on your network. This allows the PowerMAN server to send a WoL request to the PC. WakeMyPC requires a computer (which does not need to be a server) with an internet facing networking connection to be running Microsoft IIS 5 or later (Windows 2000 or later).

When this feature is enabled a PC can be simply woken by using the 'Wake' link on the PowerMAN reporting website:



| Data Synergy / ENGAGE | |
|-----------------------|---------------------------------|
| Site | Data Synergy |
| Computer | ENGAGE WakeMyPC |
| Created | 30/06/2011 |
| Last Status | 23/09/2014 |

WoL can be a problematic technology to introduce to an enterprise network. The most common issues are:

- WoL typically uses broadcast network packets. These are not routable and therefore only work within the local sub-net. This is why the WakeMyPC is necessary. It may, in some cases, also be possible to re-configure your router to forward WoL packets or use the WakeMyPC 'subnet directed broadcast' method.
- A typical WoL implementation does not include any security. It is possible to wake an arbitrary PC on the local sub-net. This should not normally be a significant security concern.
- WoL must be enabled in the system BIOS and usually in Windows Device Manager. There is sometimes a degree of trial and error required to get WoL working.

WakeMyPC is designed to overcome these issues. The WakeMyPC manual explains workarounds and suggested implementation strategies in further detail.

PowerMAN on Windows Vista / Windows 7 / Windows 8

There are minor differences between operation on Windows XP and later editions. When running on Windows Vista and Windows 7 the additional power settings, not built-in to Windows, are visible in the Control Panel power applet. This feature is not available on Windows XP.

Due to operating system differences the following minor features are not currently supported on Windows Vista and later. These features may be configured but will have no effect:

- Video dim setting
- CPU throttle setting
- Hide power applet setting
- Power meter setting
- Lid open action

In addition the following Windows Vista and later features cannot currently be configured by PowerMAN:

- Hybrid Sleep - this can be configured using the policy settings provided with Windows

Troubleshooting

PowerMAN is a very reliable program but problems do sometimes happen. Most issues arise during installation and can normally be solved quickly. The following section details some of the most common issues and explains possible solutions for them:

Problem: PowerMAN does not deploy correctly using the GPO method

This can occur for a number of reasons. The following should be considered:

1. Do other programs deploy correct via Group Policy?
2. Is the client computer within the correct Organizational Unit (OU)?
3. Are there any errors in Event Log?

If PowerMAN is the first program to be deployed via GPO there may be an underlying problem with the domain or active directory configuration. The following should be checked:

- Do other applications deploy successfully using the group policy mechanism from the same file-share? Sometimes applications are inadvertently configured to deploy from a local drive letter (on the server) and not a publically available share.
- The client computer is within the correct Organisational Unit (OU). This can be checked with the **Active Directory Users and Computers** snap-in (dsa.msc)
- The PowerMAN MSI is in share accessible (read access) to the **computer account** of the client PC. Sometimes there may be NTFS access restrictions that are stricter than the share permissions. Both types of permission should be checked. The easiest way to achieve this is to grant a Read Access to the group **Domain Computers**.

Remember: The Windows group policy engine runs in the security context of the computer account. Therefore the share and underlying NTFS permissions must grant access to this account. The effective permissions are the lowest common denominator of the share and NTFS permissions.

- Another policy or application may be preventing installation. This can be checked with the Resultant Set of Policy (RSOP.MSC) tool provided with Windows. The error tab contains information about policy deployment problems.
- Is the problem resolved by disabling Asynchronous policy deployment (see **Computer Configuration\Administrative Templates\System\Logon** in the Group Policy Object Editor)?
- Is the problem resolved by restarting the computer twice? Depending upon other group policies scheduled for installation and removal it can take up to two additional reboots for PowerMAN to install. This situation can also happen if the MSI and license settings are deployed separately because PowerMAN will not start until the product license key is present.

Microsoft also provides some advice on debugging GPO based deployment issues:

[http://technet.microsoft.com/en-us/library/cc787386\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc787386(WS.10).aspx)

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[http://technet.microsoft.com/en-us/library/cc775679\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc775679(WS.10).aspx)

Microsoft also documents a scenario where a network timeout problem can prevent effective Group Policy application. The following document explains this and provides links to the necessary Windows hotfix:

<http://support.microsoft.com/kb/840669>

In some cases it may be necessary to investigate further by enabling 'verbose' MSI logging. This can be enabled on the client computer by creating the following Registry value:

Key: HKEY_LOCAL_MACHINE\Software\Policies\Microsoft\Windows\Installer

REG_SZ: Logging

Value: voicewarmup

This will create log files in the %temp% folder (\Windows\Temp for standard Group Policy MSI deployment. The users' own temporary folder for manual MSI deployment). This following document explains this in detail:

<http://support.microsoft.com/kb/223300>

After this setting has been enabled, reboot the PC, and allow Windows to attempt the MSI installation again. When this process has completed (or nothing has happened) log into the machine and check the log files created in the \Windows\Temp folder.

If this technique does not reveal the cause of the problem it may also be useful to enable 'verbose' logging for the Windows Group Policy engine. Please remember that this is an advanced technique and it may take some time to decipher the log files. You can enable this logging by creating the following registry value. It may also be necessary to create the Diagnostics key if one is not already present.

Key: HKEY_LOCAL_MACHINE\Software\Microsoft\Windows NT\CurrentVersion\Diagnostics

REG_DWORD: AppMgmtDebugLevel

Value: 0x4b

After this setting has been enabled, reboot the PC, and repeat the installation process described above. The Group Policy engine will create a file called Appmgmt.log in the C:\Windows\Debug\Usermode folder. This is further explained here:

<http://support.microsoft.com/kb/246509/>

NB: You may also need to create the Usermode folder if it does not already exist.

Problem: The PowerMAN application appears to deploy okay but the configured policy doesn't seem to deploy consistently

This is commonly caused by attempting to apply invalid power settings. Please check the Power Management Event Log to determine the cause of the problem.

This can also be caused by attempting to configure the majority of settings against a User object rather than a computer. The following guide lines should be applied:

- The PowerMAN service should be deployed to computers (not users)
- The majority of the settings should also be deployed to computers
- If a specific user policy is required this should be deployed using a **separate group policy** to the users

Problem: PowerMAN appears to be deployed okay and the required settings are displayed in the Control Panel Power Management applet but the computer does not shutdown/hibernate/sleep as expected

OR PowerMAN reports event #2003: The computer is being prevented from entering the idle state by an unknown program

Some programs can inhibit the Windows idle timer and effectively force the computer to remain awake. There are many legitimate reasons for this. For instance:

1. Microsoft PowerPoint forces the computer to remain active when displaying a slide show
2. Microsoft Word has been seen to prevent the computer from sleeping when editing a document.
3. Microsoft Windows will force the computer to remain awake if remote users are accessing local resources (such as printers or files) through a Windows share.
4. Cyberlink PowerDVD (or similar) forces the computer to remain active when playing a DVD
5. The PowerMAN user interface or PowerSTART tools can be used to force the computer to remain active when other programs are running or the user has specified the system cannot sleep

When this happens too often or is undesirable it can prevent timeout driven power management from working effectively. This can be because of deliberate application behaviour, intermittent activity bursts, or because of non-power management aware application development practices. This is sometimes known as 'PC Insomnia'. For instance:

1. Background activity such as anti-virus scanning, system updates (for instance Symantec Endpoint Live Update or Windows Update) or automatic system optimization (such as hard disk defragmentation) may cause the system to be relatively busy.
2. Foreground activity such as a screen saver may keep the system artificially busy. Some screensavers may intermittently perform more intensive activities that result in the idle timer being periodically reset.
3. Some (mainly optical) mice can infrequently (or worse continuously) send small movements resulting the illusion that the user is active. This can sometimes happen in the presence of fluorescent light.

PowerMAN reports this problem in the Power Management Event Log. Typically this is reported as Event #2003: "The computer is being prevented from entering the idle state by an unknown program"

The following steps should be performed to locate the cause of the problem:

1. Check the Event Log. PowerMAN logs to ensure that the desired policies have actually been applied (with no errors) and that no other program is keeping the system awake.
2. Enable the Policy Enforcement settings and re-test. In most cases the system will perform the configured idle action as expected. If this option resolves the problem then one or more of the installed programs were preventing the idle action from occurring.
3. Enable additional event logging (located in the Advanced configuration section) and restart the computer or PowerMAN service. After a few minutes check the Power Management Event Log for additional information.

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4. Enable the debug log file (Advanced\All Information + Debug Log) and restart the computer or PowerMAN service. After a few minutes stop the PowerMAN service and examine the log file (see the section below on using the debug log file for more information) to determine if the system is being prevented from entering the idle state because of hardware input (mouse / keyboard) or system activity. It can sometimes help to plot the idle time remaining field using a charting tool such as Microsoft Excel. This may help you visualise the timer behaviour and understand what is happening. Often this can result in a 'saw-tooth' pattern as the timer periodically resets. There is an example of this later in this guide.
5. Reduce the idle sensitivity to a much lower value. This change increases the threshold of system activity that Windows uses to reset the idle timer. Try reducing the sensitivity to 5%.
6. Unplug the mouse and the keyboard and determine if the problem is resolved. Sometimes a faulty input device (especially an optical mouse) may be the cause of the problem.
7. Unplug the network cable and determine if the problem is resolved. If the Wake-On-LAN (WOL) feature is not required disable it. If the network card supports wake on 'directed packet' (using IP address) and this feature is not actually required try disabling it.
8. Confirm that the system will reliably sleep and/or hibernate (and resume again) on demand by using Windows Task Manager and selecting the appropriate option from the Shutdown menu.
9. Stop all running programs (one at a time if necessary) and wait for the computer to enter the idle state. This can most quickly be done by disabling PowerMAN (stop the PowerMAN service) and manually setting the idle timeout to 1 minute.

If the above steps do not reveal the cause of the problem PowerMAN Technical Support will be able to offer further debugging steps to find the cause of the problem.

Problem: A Hard Disk (HDD) spin-down policy has been applied but doesn't seem to do anything. The hard disk always remains powered on.

Unfortunately for power conservation modern installations of Windows remain stubbornly busy even when no user is present.

Unlike earlier revisions such as Windows 95/98, Windows XP includes a number of optimization features that are designed to run in the background. Coupled with the typically large number of other background services this means that many systems are never idle long enough for the system hard disk (the one containing Windows) to switch off.

On fresh OS installation it is sometimes possible for the hard disk to spin-down, in practice however, many real-world installations do not because the required level of inactivity never occurs. It is, however, quite common for systems with multiple drives to reach a point where one drive is not being used and therefore that drive will spin-down as expected. (See the next problem below for the side effects that result from this)

PowerMAN Technical support can advise on possible actions that may improve the situation.

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Problem: After enabling a Hard Disk (HDD) spin-down policy the system may sometimes freeze momentarily

If the hard disk becomes idle (see above problem) for a sufficient period it will spin down to save energy. When the system is activated again (for instance by a user moving the mouse or pressing a key) the hard disk is accessed again and usually takes several seconds to spin up. During this time the system may appear to freeze momentarily.

As noted in the previous problem it is quite unusual for the system hard disk to become idle enough to spin down. However, in systems with more than one hard disk it is quite likely that the secondary drives will power off after a period of inactivity. Therefore this symptom is usually more apparent on such multi-drive systems.

Typically this problem can be resolved by increasing the HDD policy timeout to the same value as the monitor timeout. This means that the HDD will spin-up at the same time the monitor powers on and therefore the delay will not be apparent to the user.

Problem: PowerMAN reports that there are fewer computers than expected in the site

OR PowerMAN reports many more computers than expected in the site

OR PowerMAN reports unexpected duplicate computer names within the same site

OR PowerMAN reports computers that seem to be on more than 24 hours a day!

OR PowerMAN is deployed using an image based Windows installation and only one client is reported. The service appears to be operating okay on each computer

These symptoms are commonly seen in the following circumstances:

1. A problem is preventing PowerMAN being deployed correctly. This will reduce the number of computers registered in the site
2. Computers containing a working PowerMAN installation are cloned using imaging software such as Symantec Ghost.

PowerMAN uses a randomly generated identity (called the ClientGUID) to distinguish each computer within a site. If an image is deployed with such an identity PowerMAN is unable to determine this has happened and therefore all computers have the same identity. This can cause most computers to be ignored by the logging server.

This problem can be worked around by using the following technique:

- Temporarily stop the PowerMAN service with **ONE** of the following commands:

```
NET STOP POWERMAN
```

or

```
POWERMAN STOP
```

- Delete the following value from the registry:

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HKEY_LOCAL_MACHINE\SOFTWARE\PowerMAN\ClientGUID

- If necessary shutdown the computer
- Create the image
- Do not restart the computer until the image is created because the PowerMAN service will create another Client GUID

Problem: PowerMAN is installed but the computers are not showing up on the reporting system

OR Power Management Event Log reports Event #6015: Downloaded XML was corrupt

OR Power Management Event Log reports Event #6032: Server failed to respond

OR PowerMAN Enterprise Server logs show frequent truncated XML uploads (typically around 1,400-1,500 bytes in size)

OR PowerMAN reporting fails to work consistently with M86 Security / Trustwave web content filter when split packet detection is enabled

OR PowerMAN reporting previously worked but the PID key expired or the workstation was turned off for a prolonged period and reporting subsequently fails to work or work consistently

PowerMAN records and transfers log data on a daily basis. The data is not sent until the close of the day. If the reporting feature is enabled the data is transferred to the reporting server. When the hosted PowerMAN reporting system is being used this is located at pmstats.org. If a private PowerMAN Enterprise Server is being used then this address will normally be located somewhere on the enterprise network.

The upload normally happens between 00:00 and 03:00 if the computer is on or within a few minutes of the computer next starting. Therefore, if you installed PowerMAN today it will not report anything until tomorrow.

If computers do not register within 24 hours of being installed with PowerMAN then there may be a configuration problem. The following should be checked:

1. The SiteGUID setting is correctly configured and registered on the PowerMAN reporting server. The SiteGUID should always contain the {brace} characters.
2. The server address. This is normally pmstats.org. There is no need to prefix this with http:// or www.
3. The server port. This is normally 443. In some circumstances it may be necessary to use the alternate port 8080. This is commonly necessary in networks which bar all HTTP traffic but permit standard SSL traffic.
4. The proxy address and port setting. If you are using a proxy server please check that server address and port are correctly configured. The proxy should permit unauthenticated HTTP traffic to the reporting server. The proxy server logs may also indicate the cause of the problem.

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5. The Power Management Event Log. This will probably explain the cause of the problem. Some upload problems are reported using a standard Winsock error code. These are explained in the following Microsoft document:

[http://msdn.microsoft.com/en-us/library/ms740668\(VS.85\).aspx](http://msdn.microsoft.com/en-us/library/ms740668(VS.85).aspx)

In some cases it may be helpful to enable additional event logging (located in the Advanced configuration section) and restart the computer or PowerMAN service. This may be combined with the `FORCEUPLOAD` command (see below).

Power Management Event #6015: 'Downloaded XML was corrupt' indicates that there was a problem with the response data from the PowerMAN server. This can happen when an intermediate proxy server blocks the traffic and returns a human-readable error page.

NB: The pmstats.org hosted reporting service has two redundant IP addresses. Ideally firewalls should be configured to use the DNS name pmstats.org. If this is not possible then BOTH IP addresses should be configured to ensure reliable operation. The addresses are 92.27.62.83 and 212.248.221.157.

In some circumstances it can be useful to force an upload. Please remember this will only work if **more than one** day of log data is present. It is never possible to force the upload of the current, incomplete, log data. To force an upload use the following command:

```
POWERMAN FORCEUPLOAD
```

If the above steps do not resolve the problem it may be necessary to investigate and debug the network communication between the computer running PowerMAN and the server. This advanced technique may be especially useful when using an intermediate proxy server. PowerMAN uses a standard Windows supplied component called WinHTTP to perform network communication. This is the same library used by most of Windows including Internet Explorer. Microsoft has incorporated a logging system into WinHTTP that can be used to examine the network traffic. Windows XP and earlier use a specific tool to enable logging. On Windows Vista and later this functionality is built-in to the operating system.

On Windows XP/2003 and earlier proceed as follows:

1. Confirm that there is some PowerMAN data to upload. The easiest way to check this is to confirm that more than one log value exists in `HKLM/Software/PowerMAN/Logs`
2. Obtain the WinHTTPTraceCfg tool. This is in the Windows 2003 Resource Kit
3. Enable WinHTTP tracing with the following command:

```
winhttptracecfg -e 1 -d 0 -s 2 -t 1 -l c:\winhttplog
```

This will create a series of files in the `C:\` folder prefixed 'winhttplog'

4. Force an upload using the above technique:

```
POWERMAN FORCEUPLOAD
```

Check the `C:\` folder for a log file (there may be several). These show the network transaction with the (proxy) server

5. Remember to disable logging with the command:

```
winhttptracecfg -e 0
```

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On Windows Vista and later proceed as follows:

1. Confirm that there is some PowerMAN data to upload. The easiest way to check this is to confirm that more than one log value exists in HKLM/Software/PowerMAN/Logs
2. Create a folder for the log files e.g. C:\Logs
3. Ensure that Everyone has “Full Control” access to the C:\Logs folder. This step is necessary because WinHttp runs in several different security contexts.
4. Open a CMD prompt and launch NETSH.EXE
5. At the prompt type: `winhttp` and press **Enter**
6. To view the current configuration use the following command and press **Enter**:

```
show tracing
```

7. To view the syntax available use the command:

```
set tracing /?
```

8. To configure logging use the command:

```
set tracing output=file trace-file-prefix=c:\logs\powerman  
level=verbose format=ansi state=enabled
```

This will create a series of files in the C:\logs folder.

9. Force an upload using the above technique:

```
POWERMAN FORCEUPLOAD
```

Check the C:\logs folder for a log file (there may be several). These show the network transaction with the (proxy) server

10. Remember to disable logging with the NETSH command:

```
set tracing state=disabled
```

Microsoft provides a reference to the NETSH commands used for WinHTTP logging here:

[http://technet.microsoft.com/en-us/library/cc731131\(v=ws.10\).aspx](http://technet.microsoft.com/en-us/library/cc731131(v=ws.10).aspx)

The most common proxy server communication issues are:

- Incorrect proxy server address / port setting
- Proxy server requires authentication – PowerMAN does not support proxy authentication. You can work around this behaviour by creating an proxy server exception for the PowerMAN server
- The PowerMAN server address is missing from the proxy ‘white-list’

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Specific problems when Trustwave Web Filtering and Reporting Suite (formerly known as M86 Web Filtering and Reporting Suite) is present:

PowerMAN reporting may fail to work consistently when Trustwave Web Filtering and Reporting Suite (formerly known as M86 Web Filtering and Reporting Suite) is present. This software is commonly used in educational establishments to provide web content filtering and logging.

This problem occurs because the web filtering software truncates multipacket HTTP POST requests. This can prevent the PowerMAN reporting protocol from operating correctly when attempting to upload a backlog of multiple days reporting data. This scenario is most common when a workstation has been turned off for a prolonged period or a PowerMAN product key has expired and been updated sometime later. This scenario is less likely if no PowerMAN reporting data backlog has built-up. For this reason the problem not initially be apparent and may emerge later.

If this problem occurs the WinHTTPTraceCfg (or proxy) logs will typically show something similar to:

"Redirected by M86 Web Filter Internet access to the requested website has been denied based upon your user profile and organisation's internet usage policy" (Result code 302)

This problem can be worked around by modifying the content filter settings to **disable split packet detection**. The M86 documentation states that this feature is disabled by default. However, if split packet filtering is enabled the scenario described above may occur.

Customers have also reported that this problem can be worked around by adding the reporting server domain (typically pmstats.org) into a content filter category that is permitted for workstations with a currently logged on user and when there is no logged on user.

Problem: Windows Power Management applet reports blank or incorrect status for a power action or power timeout

The Windows XP Control Panel Power Management applet (Powercfg.cpl) is only designed to show certain power states (it does not support power off) and certain timeout values (1, 3, 5, 10 minutes etc). PowerMAN allows other values to be specified which the applet is incapable of displaying. In most circumstances the relevant value is displayed as blank **or** downgraded to the nearest displayable setting. This does not alter the application of the desired policy which will function as desired.

Problem: The PowerMAN service (or power configuration) is applied using a logon script but does not consistently work

PowerMAN is a service application and therefore must be installed by an Administrator (or via GPO). Similarly, the majority of PowerMAN settings are in the HKEY_LOCAL_MACHINE area of the registry and this is not modifiable by most users. PowerMAN cannot be installed or configured from a user logon script.

Problem: The 'Managed' power scheme does not appear in the Windows Control Panel

OR The settings in the Windows Control Panel do not match those configured

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PowerMAN typically only refreshes power settings every 10 minutes. Therefore it may take a few minutes for recently changed settings to become active. Group Policy settings can sometimes take up to 120 minutes to propagate across the network. Please be patient.

You can force a faster update using the following commands:

```
GPUPDATE /FORCE  
POWERMAN RESTART
```

Sometimes it isn't possible for PowerMAN to activate the configured settings. This can happen if there is an inconsistency in the settings or (sometimes) if the hardware is not capable of configuration selected. If the desired settings do not appear in the Control Panel applet or configuration doesn't function as expected please check the Power Management event log.

Problem: Sleep has been configured (suspend to RAM). The power saving is not as great as expected

There are several levels of sleep called (S1-S3). Each offers increased amounts of energy saving by progressively stopping additional levels of the PC hardware. All resume within a second or two and therefore the highest (S3) setting should be used wherever possible. Sometimes PC motherboards are not capable of S3 (or have been configured to use S1 instead). Sometimes these are referred to as **Suspend to RAM** and **Power On Suspend**. Please check your BIOS settings to ensure that S3 support is enabled.

Windows XP / 2003 can prevent use of the S3 state when USB devices are connected (preferring the S1 state). This feature is implemented because of problems sometimes found with resume from S3 when using USB devices. Microsoft explains this in the following document:

<http://support.microsoft.com/kb/841858>

Problem: A scheduled wake policy has been configured but nothing happens

Unfortunately not all computers are capable of resuming from all sleep states. This functionality depends on underlying support from the PC motherboard hardware which is not always present. The following steps should be checked:

1. Check the Power Management Event Log. A problem may be preventing the wake policy from being applied
2. Use the `POWERMAN INFO` command to determine the supported wake states. Check the value of `Min RtcWake State`. This is the highest (S1-S5) state from which the computer is capable of waking. Sometimes this can be changed by modifying the BIOS settings.
3. Check the BIOS Power Management settings. Different BIOS manufacturers use different terminology for the wake-up / resume feature. If the computer supports this function it is normally located in the power management settings and may be described as S1/4 Resume, Alarm Resume or similar. This setting should not be confused with the BIOS based alarm feature (with a resume time) that is present in some older BIOS.
4. Attempt wake from different levels of sleep – some computers can wake from hibernate whilst others can only wake from the suspended state. You can test this using the `POWERMAN HIBERCHECK` and `SLEEPCHECK` commands. Remember most hardware does not support wake from the powered off state (although it is quite common for wake from hibernate to work fine). In addition, some laptop computers are designed to prevent system resume when

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running on battery (DC) power. To confirm this re-test the computer when the mains supply is connected.

5. Contact the motherboard vendor to determine if the required functionality is available

Problem: The computer is configured to hibernate or sleep. Sometimes the previous user leaves the workstation without logging off and this can lock the workstation for the next user

This problem can be avoided by using the logout feature. Configure the Default (or specific user) power settings to log the user out after the desired time period. Configure the Default policy idle action to 'Nothing' when using the logout feature and use a suitable No User policy to save energy. Systems configured using this approach will never be locked.

Problem: Windows displays a pop-up message during hibernation - Insufficient System Resources Exist to Complete the API

This problem is caused by a known issue in Microsoft Windows XP. This problem typically occurs when the computer uses 1 gigabyte (GB) or more of RAM. The following Microsoft document explains how to obtain the required hotfix:

<http://support.microsoft.com/kb/909095>

Problem: PowerMAN appears to be installed but will not start**OR PowerMAN service starts and then stops again****OR The event log reports a problem with the Terminal Services service (TermService)**

PowerMAN is designed for simple, single-file, deployment and does not depend on any non-Windows components or external frameworks (such as Microsoft .NET). When running on Windows XP PowerMAN requires the Terminal Services (TermService) service to be available. This service is used to provide power configuration for non-administrator users. This service is not required when PowerMAN is running on Windows 2000, Windows Vista or later.

PowerMAN will operate correctly on systems where the TermService is set to manual (the default) or automatic start. However, the PowerMAN service will fail to start if the TermService is disabled. Some organisations disable this service to reduce memory footprint or enhance system security. This configuration is unfortunately not compatible with PowerMAN when running on Windows XP.

Microsoft documents the following method to disable remote desktop access without disabling the TermService:

<http://support.microsoft.com/kb/306300>

Problem: PowerMAN works correctly on some computers but gives inconsistent results on others. The settings used are the same in both cases**OR PowerMAN works correctly on some computers but others have a recurring error in the Power Management event log**

There are several reasons why this may happen:

1. Incomplete power settings / Interaction with pre-existing settings – This happens when pre-existing settings are not fully replaced by the new PowerMAN configuration. For instance, if specific user policies are used or a NoUser policy is applied this can still leave periods when no PowerMAN policy is applicable. In this case the pre-existing settings present on the computer are used. This scenario is especially likely if other power centralised-management techniques (such as EZ-GPO) have been trialed on the same systems in the past.

This problem can be avoided by ensuring that a Default policy is always applied. This step may not be strictly necessary but it will ensure that a known power configuration is always operational.

2. Hardware limitations / Windows Configuration – Sometimes the configured power policy may not be supported by the computer hardware or existing Windows configuration. This commonly occurs when sleep mode is not supported (or is disabled in the BIOS) or the hibernation feature is not enabled. Depending upon the cause of this PowerMAN may use alternative settings or do nothing. PowerMAN reports this in the event log.

Rarely similar problems can happen if no global settings are employed. To avoid this and ensure that the power configuration always works as intended we suggest the following guidelines:

- Remember to check the hardware capabilities. This can be done with the `POWERMAN INFO` command. Only use sleep if it is supported by the hardware
- Similarly, remember to enable the hibernate feature if you intended to use hibernate as an idle or scheduled action
- Always configure a default policy idle (even if it does nothing)

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- Always configure a Global power policy (even if its settings are trivial)
- Remember to check the event log. It may provide further explanation of the problem

Problem: The power policy doesn't work as expected. The Hard Disk / Monitor timeout is less than the idle timeout

PowerMAN will reject inconsistent settings. For instance, it is not possible to configure the hard disk to spin-down or the monitor to standby after the system has already entered a low-power state. Please change the settings to ensure that the hard disk or monitor timeout is less than the idle timeout. Please check the Power Management event log for further information.

Problem: Some computers wake-up (resume) unexpectedly

There are several reasons a PC may automatically resume from a low-power state. The following steps will help isolate the cause of the problem:

1. Unplug the mouse and the keyboard and determine if the problem is resolved. Sometimes a faulty input device (especially an optical mouse) may be the cause of the problem
2. Unplug the network cable and determine if the problem is resolved. If the Wake-On-LAN (WOL) feature is not required disable it. If the network card supports wake on 'directed packet' (using IP address) and this feature is not actually required try disabling it
3. Study the power management event log. Is there a pattern? Does the automatic resume happen at set times or regular intervals?
4. Try a minimal software image removing all non-essential applications. The automatic resume maybe caused by another application

Problem: Some computers fail to suspend / resume reliability and consistently

Successful power management implementations often make extensive use the suspend (sometimes called sleep) and resume functionality present in modern computers. In most situations these functions work very well and require no specific configuration to be effective. Occasionally, however, some computers may have problems either successfully suspending or resuming to an operational state.

There are many potential reasons why this may happen and it may require some experimentation to fully diagnose. The following sections explain the basic steps that you can take to isolate the cause of such a problem. A separate troubleshooting section explains the steps that may be required on some systems to allow the computer to wake from a specific input (such as a USB keyboard or via Wake-On-Lan).

For the purposes of this troubleshooting procedure 'suspend' means either S1, S2 or S3 sleep (sometimes called 'suspend-to-RAM') rather than hibernation (S4) which is sometimes known as 'suspend-to-disk'. In Windows 2000 and later S4 is implemented almost exclusively by the operating system itself and therefore is less prone to failure caused by hardware or BIOS issues.

It is important to remember that **PowerMAN itself does not implement suspend and resume**. These functions are provided by the underlying Windows operating system.

Depending upon the configuration PowerMAN operates in the following ways:

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- **Suspend with idle timeout** – PowerMAN creates a standard Windows power policy (visible in the Control Panel power applet – powercfg.cpl) and operating system implements the policy. There is therefore no practical difference between a centrally deployed PowerMAN policy and one manually created on the PC.
- **Scheduled suspend, enforced suspend and shutdown (Windows Vista and later)** – PowerMAN instructs Windows to suspend or shutdown the PC and the operating system implements the suspend operation. This is identical to using a third party program (for instance SysInternal's PSShutdown) to perform this procedure and very similar to pressing the suspend button.

The following procedure should be followed:

Isolate PowerMAN from the problem. Try the following steps:

1. Temporarily remove the PowerMAN service (POWERMAN REMOVE)
2. Manually create a similar power policy using the Control Panel. It may be helpful to use a minimal timeout value
3. Determine if the PC will suspend/resume reliably

Manually initiate a suspend operation:

1. Download the PSShutdown utility. This is available from:
<http://technet.microsoft.com/en-us/sysinternals/bb897541.aspx>
2. Initiate a manual suspend operation with the following command

```
psshutdown.exe -d -t 5
```

It can sometimes be unclear if the problem is occurring during suspend OR resume. Try the following:

1. Manually suspend the PC and observe the process. A successful suspend will have the following characteristics:
 - Operation may take 5-30 seconds (depending upon configuration)
 - Windows will usually report the operation is in progress. This does not happen in Windows Vista and later when hybrid sleep mode is enabled
 - The screen becomes blank. External monitors should switch to standby mode within a few seconds
 - The hard disk should spin down. This may make a distinctive sound
 - The fan should stop running (and the PC become generally quieter)
 - A hardware indicator may illuminate or start flashing to indicate the PC is suspended
2. Similarly, a successful resume will have the following characteristics:
 - Resume operation can be initiated by keyboard/mouse button press or by pressing the hardware sleep/power buttons or, sometimes, opening a laptop lid.

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NB: Sometimes it may not be clear how to initiate the resume process or it may not be possible to initiate resume using the desired method. This is distinct from being unable to initiate the resume process using ANY method and is discussed further below.

- The hard disk will spin up
- The fan will resume operating (and the PC become generally noisier)
- On a laptop PC the screen backlight will turn-on. On a desktop PC the monitor will return to the normal power mode (often with a distinctive click) and a flashing cursor may be displayed
- After a few moments (sometimes up to 30 seconds) the normal Windows user interface will be displayed
- The PC will respond to mouse / keyboard input and normal application operations can be resumed

If the PC will suspend but it is not obvious how to resume the PC please try the following

1. Confirm if the PC will resume automatically. This may provide reassurance the problem is caused by being unable to initiate the resume operation rather than the PC being unable to resume. The simplest way to do this is with the following PowerMAN command which will suspend the computer and then resume it 60 seconds later:

```
POWERMAN SLEEPCHECK
```

2. Double check the PC will hibernate and then resume. The simplest way to do this is with the PSShutdown utility:

```
psshutdown.exe -h -t 5
```

3. Check the PC BIOS settings and confirm the following:
 - Suspend / Sleep (Sometimes called S1/S2/S3) is enabled
 - The keyboard / mouse can wake the PC (especially for non-USB devices)
 - USB devices may wake the PC (for USB keyboards and mice)

Determine if the problem occurs every time or just sometimes:

1. Repeat the manual suspend operation 10 times
2. Record the number of times the operation fails. Does the operation fail on suspend or resume?

Determine if the problem is caused by S1 or S3:

1. Check the PC BIOS settings and look for a setting related to suspend / sleep mode. This is sometimes called Suspend-to-RAM or S1/S3
2. Repeat the above steps for both S1 and S3. S3 is a deeper sleep state that requires less energy. Some systems work correctly with S1 but are inconsistent or unreliable with S3.

Determine if the problem occurs on a specific model of PC or with a specific software image:

1. Repeat the basic tests on a number of different computers. Does the problem only occur on specific models or with specific hardware / software revisions?

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2. Try to initiate suspend directly at the logon prompt. Does the problem still occur on first boot-up prior to logging on? Does the problem become more evident after the PC has been in use for a period of time? This may indicate the problem is related to a specific application.

NB: It may be helpful to use the Control Panel power applet, powercfg.cpl, to configure the power button as a 'sleep' button.

3. Unplug any non-essential devices, reboot, and repeat the tests. If the PC has a USB keyboard/mouse and supports a legacy PS/2 keyboard/mouse retry the operation with the PS/2 devices. This may indicate the problem is related to USB (this is quite common)
4. Repeat the tests using a 'clean' software image that contains the basic Windows installation and minimal drivers
5. Check that the latest Windows service pack and hot fixes are installed. This is often easily achieved by using the Windows update tool.
6. Double check for driver updates. The most common drivers to cause problems are Video, Sound and Network related drivers.
7. Contact the PC vendor and determine if there is a known problem with suspend. Confirm if there is a BIOS update available for the PC.

The following Microsoft Knowledge Base documents may also be useful:

| Article | Title |
|---|---|
| http://support.microsoft.com/kb/952117 | When you try to put a Windows XP-based computer into hibernation or into standby, the computer stops responding |
| http://support.microsoft.com/kb/907477 | How to troubleshoot hibernation and standby issues in Windows XP |
| http://support.microsoft.com/kb/815304 | The computer does not resume from hibernation or does not Wake-on-LAN from standby |
| http://support.microsoft.com/kb/331506 | Computer Stops Responding When You Stand-by or Hibernate More Than One Time |
| http://support.microsoft.com/kb/822827 | Computer stops responding after you put it into hibernation, and then resume it from hibernation many times |
| http://support.microsoft.com/kb/951447 | A Windows XP SP3-based computer loses wireless connectivity when it resumes from standby or from hibernation, or you receive an error message when you try to put the computer in standby or in hibernation |
| http://support.microsoft.com/kb/302713 | Error Message: Power Policy Manager Unable to Set Policy. Indicates Two Revision Levels Are Incompatible |
| http://support.microsoft.com/kb/841858 | Description of how to enable the S3 system power state for standby when USB devices are armed for wake |
| http://support.microsoft.com/kb/831114 | Your USB keyboard or USB mouse does not work when you resume your Windows XP- |

| | |
|---|--|
| | based computer from standby |
| http://support.microsoft.com/kb/878467 | Your Windows XP-based computer does not resume from standby when you move your USB mouse or press a key on your USB keyboard |
| http://support.microsoft.com/kb/833837 | You receive a "Stop 0x0000008E" error message after you resume your (Windows XP) laptop computer |
| http://support.microsoft.com/kb/890042 | <p>You lose access to network resources after you resume your Windows XP-based computer from standby</p> <p>NB: This hotfix is documented for use with systems using smartcard authentication. There have been reports this hotfix also works in some non-smartcard scenarios.</p> |

Problem: Unable to resume computer using selected input / button method

OR Unable to resume PC using a USB keyboard / mouse

OR Unable to resume PC using Wake-On-Lan (WOL)

OR Unable to configure Device Manager power management remotely

Most computers can be configured to suspend / resume with little difficulty.

However, sometimes, it can be difficult to initiate a 'resume' from suspend (S1, S2 or S3) or hibernate (S4) using the desired method. This is a distinct problem and should not be confused with systems that are unable to suspend or resume reliably. The most common scenario is that the PC can resume but not using the desired keyboard, mouse or Wake-On-Lan (WOL) method. This may cause user experience problems and potentially cause a power saving initiative to fail.

This troubleshooting section explains the most common scenarios and how they may be resolved.

There are four stages to this process:

1. Confirm the system can suspend and resume reliably (using ANY method)
2. Check the appropriate BIOS settings
3. Check the related Windows Device Manager settings
4. Check and configure the Power Management settings (this can be done with PowerMAN)

First, confirm that system can actually suspend and resume reliably using **any method**. The simplest approach is as follows:

1. Use the following command to initiate a suspend operation:

```
POWERMEN SLEEPCHECK
```

2. Wait two minutes. The system should resume automatically within this time

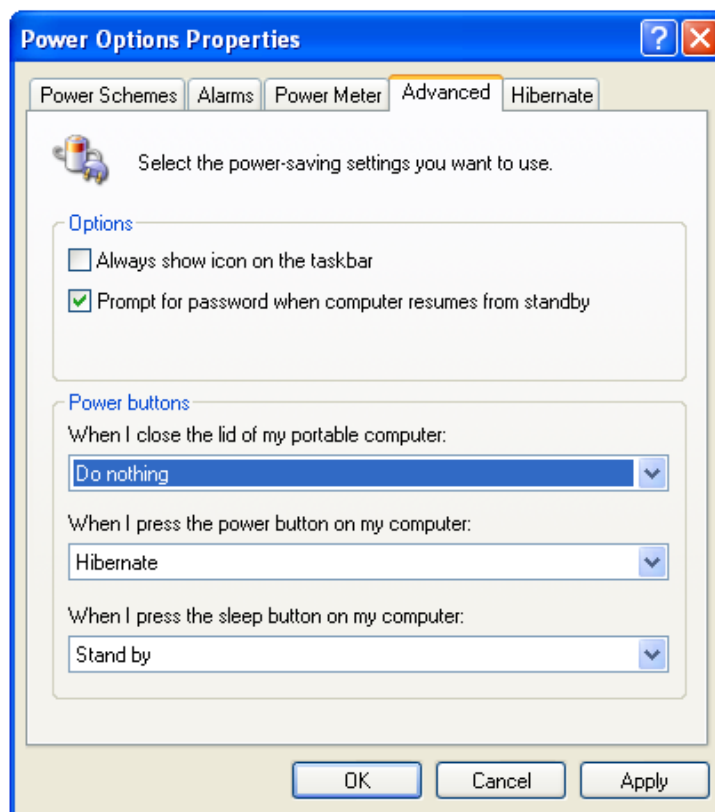
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3. If this does not happen this may indicate the PC does not (currently) support automatic resume. Follow the following sections to resolve this.

The most simple resume method is a dedicated hardware button. Some systems include such buttons (although they are not always connected). Such buttons may normally be configured via a BIOS setting. It is not possible to configure this behaviour from Windows. Please check the BIOS configuration to determine if this is supported on your specific PC.

A second, related, approach is to initiate system resume using a legacy PS/2 keyboard (not a USB keyboard). As above, these are configured using only BIOS settings and do not require any configuration of the related Windows Device Manager entry. In some cases pressing any key will resume the system whilst in others a specific key must be pressed. Some systems also support resume via PS/2 mouse buttons. Please check the PC BIOS configuration to determine if this is supported on your specific PC.

Dedicated hardware sleep/resume buttons (including those on some legacy keyboards) may be configured using the PowerMAN 'Global Power Settings' feature. This is similar to the Power Options dialog in Windows 2000/XP/2003 Control Panel Power applet:



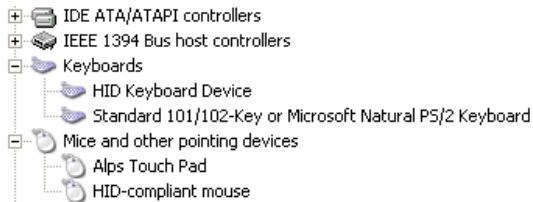
When investigating suspend / resume issues it can often be helpful to configure the hardware 'Power' button as the 'Sleep' button. This is especially useful on systems that do not have a dedicated sleep button or where this is not connected or appears to not function correctly. Please consider re-configuring the 'Power' button temporarily to check this.

Configuring the system to resume from a USB keyboard or mouse is considerably more complex than in the legacy cases above. This is because the functionality must be configured in the BIOS, Windows Device Manager and sometimes the related USB Hub devices. To configure resume from for USB keyboard please check the following:

1. The BIOS supports USB resume and this is enabled (often there is a dedicated setting called 'Resume on USB' or similar)

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- The Device Manager entry for the keyboard has the 'Allow this device to bring the computer out of standby' option ticked:



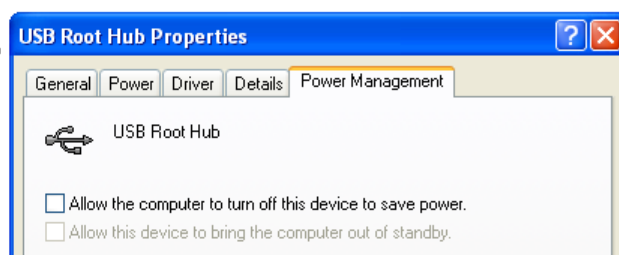
- If this option is unavailable (greyed out) then this may indicate that the related BIOS feature is not enabled.
- In some case this may also indicate that Windows has disabled resume for this device because the system is using the S3 suspend mode. This is only applicable to Windows XP.

To restore the functionality create a 'USBBIOSx' value in the Registry. This is described in the Microsoft KB article 'Description of how to enable the S3 system power state for standby when USB devices are armed for wake':

<http://support.microsoft.com/kb/841858>

NB: Very rarely enabling this feature may result in increased system instability or poor suspend/resume consistency. Please test this thoroughly prior to live deployment.

- If the USB keyboard is connected via a USB Hub then this device must be configured to remain powered and not standby. This is because the hub must remain powered for the keyboard to operate. Please remember that in some cases the USB hub may be internal to the PC. To prevent a USB hub from entering the standby state un-tick the 'Allow the computer to turn off this device to save power' option in Device Manager.



Some system administrators use the Wake-On-LAN (WOL) feature to initiate system power-on or resume from a remote location. This is commonly used for patch management and remote support. WOL is a complex topic requiring specific hardware and network support. To allow WOL to operate the following must be correctly configured on the client PC:

- WOL must be enabled in the system BIOS (if present)
- The following options must be selected (ticked) in Device Manager:

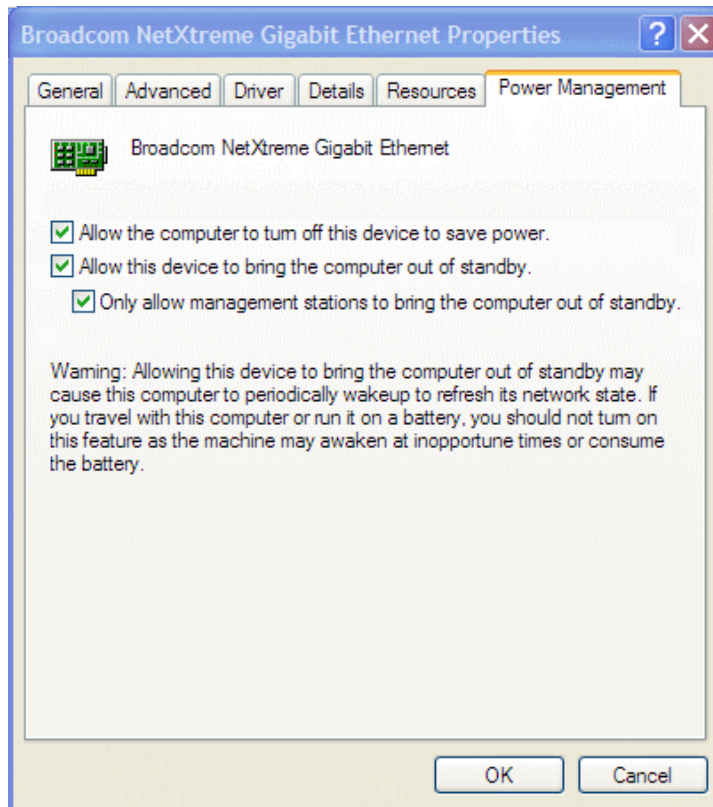
Allow the computer to turn off this device to save power
 Allow this device to bring the computer out of standby / wake the computer

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Only allow management stations to bring the computer out of standby

NB: Some systems are unable to resume from S5 (full power-off) using WOL. Please check your system BIOS – in many cases there is a specific setting related to S5 WOL. A ‘management station’ means a true WOL ‘magic’ packet and not more general network traffic.

Please contact Data Synergy Technical Support if you require further advice on WOL.



Sometimes it may be necessary to automate the deployment of these settings. This can be done using a script or batch file at deployment time. The following Microsoft documentation may also be useful:

| Article / Title | Notes |
|---|--|
| <p>http://support.microsoft.com/kb/837058</p> <p>How to disable power management for a network adapter when you deploy Windows XP.</p> | <p>This document explains the PnPCapabilities Registry setting. This is a DWORD value where the network device wake-up configuration is stored: HKLM\SYSTEM\CurrentControlSet\Control\Class\ [DriverKey]</p> <p>The following (hexadecimal) values are commonly used:</p> <p>No options ticked = dword:00000038 Allow device power saving = dword:00000030 Allow device to wake PC = dword:00000020 Management stations only = dword:00000120</p> <p>The system must be rebooted for a change in this setting to become active and be reflected in Device Manager.</p> |

| | |
|--|--|
| <p>http://msdn.microsoft.com/en-us/library/ms793220.aspx</p> <p>Enabling Selective Suspend</p> | <p>This document explains the HcDisableSelectiveSuspend Registry setting. This is a DWORD value that is linked to the 'Allow the computer to turn off this device to save power' option in Device Manager. It may be necessary to change this setting to prevent a USB hub from entering standby:</p> <p>HKLM\SYSTEM\CurrentControlSet\Control\Class\[DriverKey]</p> <p>The following (hexadecimal) values are commonly used:</p> <p>Disabled = dword:00000000 Enabled = dword:00000001</p> <p>The system must be rebooted for a change in this setting to become active and be reflected in Device Manager.</p> |
| <p>Undocumented by Microsoft</p> | <p>The WaitWakeEnabled Registry setting is a DWORD value that is linked to the 'Allow this device to bring the computer out of standby' option in Device Manager. It may be necessary to change this setting to allow a USB keyboard / mouse to wake the system:</p> <p>HKLM\CurrentControlSet\Enum\[DeviceInstancePath]\Device Parameters</p> <p>The following (hexadecimal) values are commonly used</p> <p>Disabled = dword:00000000 Enabled = dword:00000001</p> <p>The system must be rebooted for a change in this setting to become active and be reflected in Device Manager.</p> |
| <p>http://support.microsoft.com/kb/841858</p> <p>Description of how to enable the S3 system power state for standby when USB devices are armed for wake</p> | <p>This article explains how to allow S3 suspend / resume on Windows XP when using USB devices.</p> <p>The system must be rebooted for a change in this setting to become effective.</p> |
| <p>http://support.microsoft.com/kb/878467</p> <p>Your Windows XP-based computer does not resume from standby when you move your USB mouse or press a key on your USB keyboard</p> | <p>This article explains a problem in Windows XP that can prevent a USB mouse from being used to wake the system if the mouse is moved whilst the system is suspending. This problem is not currently fixed by Microsoft.</p> |

Problem: Network drive is disconnected after system has resumed

This problem can occur on some systems if the server connection has timed out. This following Microsoft article explains how to resolve this problem:

<http://support.microsoft.com/kb/297684>

Problem: Power Management event log reports error #1019 - Product key has expired. Please contact your sales representative to obtain an updated product key. The software will continue to function in reduced functionality mode

This indicates that the PowerMANMAN PID key has expired. This can happen during product evaluations when a time limited PID key is used. Non-evaluation PID keys are perpetual and do not expire. Please contact you Sales Representative to obtain an updated PID key.

Problem: Shutdown scripts are ignored on Windows 2000/XP/2003

This problem may occur on Windows 2000/XP/2003 where an idle policy has been configured to shutdown the system rather than suspend (sleep or hibernate). The built-in Windows idle timer does not correctly support system shutdown and fails to execute operating system shutdown scripts. This is a known limitation of Windows. The PowerMAN internal shutdown timer feature is available to work around this problem. When this feature is enabled PowerMAN implements the idle timer internally and shutdown scripts will execute as expected. This feature is disabled by default. This feature is available in PowerMAN v5.2 and later.

Problem: PowerMAN is installed but not in the path (64-bit systems)

This problem may occur when the 32-bit version of PowerMAN is installed on 64-bit systems. The PowerMAN client is a common executable (EXE) on all supported versions of Windows. The client software is available in both 32-bit and 64-bit formats. The 32-bit version may be used in mixed 32/64-bit workstations estates and offers identical features on 64-bit systems. The 64-bit version is provided to support 100% 64-bit environments. If the 32-bit version is installed on a 64-bit system it is located in the **Windows\Syswow64** folder. This is not in the standard command-prompt search path.

Problem: Power management event log reports event #4042: The managed power policy has been repeatedly applied x successive times. This may indicate that another program (or user) is changing the policy settings. It may also indicate a problem with the policy settings. This warning may also be generated if multiple policy changes are for very quick succession.

Occasionally other programs may interfere with PowerMAN. This event warns that PowerMAN has repeatedly configured the chosen power settings because some other process is also changing them. In some rare circumstances it may also indicate that Windows has changed the applied power settings because they are incompatible with the system hardware. If this continues please check policy settings, hardware support (PowerMAN INFO) and enable additional event logging to determine the cause.

Problem: Power management event log repeatedly record warning events #4030/4059

Events #4030 and #4059 record the pre-existing and post-configuration Windows power settings respectively. If these settings contain inconsistencies it may result in them failing to operate as expected. PowerMAN contains logic to check for such inconsistencies and warn about them both before and follow a configuration cycle. The most common inconsistency is where the video or hard disk timeout is greater than the idle timeout. PowerMAN issues these warnings for both the PowerMAN 'managed' power scheme and the built-in Windows power schemes. Therefore you may ignore these warnings if you are not using PowerMAN for active power management (e.g. monitoring only).

Problem: Power reporting is inconsistent or intermittent when installed alongside Faronics™ Deep Freeze™, Microsoft Steadystate or similar system restoration / system security software**OR Workstations are frequently re-imaged and this interferes with the PowerMAN reporting feature**

Several system products exist which prevent effective write-access to the local file system. These products generally operate by re-directing all file write requests to a temporary file which is deleted upon restart. This creates a system which is effectively reset upon start-up and therefore immune to unauthorised re-configuration by users or installed software. This software is commonly used in high-turnover environments such as school computer labs or university open-access areas.

Such software can interfere with the PowerMAN reporting mechanism.

This happens because PowerMAN caches reporting data in the local registry and only uploads it periodically. If the system is restarted prior to a PowerMAN upload the cached data can be lost resulting in intermittent reporting coverage. The result can be large gaps in the reported data.

This problem can be avoided by using the 'Log Backup' feature located with the reporting settings. This allows a parallel reporting log backup file to be stored in an arbitrary local drive/folder. This file is used by PowerMAN if the primary registry based data is missing. This PowerMAN feature may also be used as part of a frequent re-imaging strategy. There are two common scenarios:

- **System frequently re-imaged (e.g. daily)** – Configure the log back up file and incorporate it into the re-imaging process. Typically this will require the file to be stored elsewhere prior to re-imaging and restored to the original location prior to system restart.
- **System security software** – Configure the log backup file to be stored in a protect filesystem location (e.g. The 'Thaw space' for Faronics™ Deep Freeze™)

Using the debug log to investigate problems

Sometimes power policies may not behave as expected. As described above this can happen for a number of reasons and sometimes it can be difficult to pinpoint the exact cause of the problem. This is more common in Windows XP which has a more complex power management implementation which may rarely reject or transparently change apparently valid policies.

PowerMAN includes a feature that, when enabled, will dump useful system state information to a log file every second. This feature can result in very large log files and therefore should only be enabled when investigating a problem.

There are **two different** ways that this feature can be enabled:

- Enable **Advanced/All Information + Debug Log**. This will create a file called `powerman.log` in the same folder as the PowerMAN executable file
- Manually configure a log file

To manually configure the debug log proceed as follows:

1. Start `Regedit`
2. Navigate to `HKEY_LOCAL_MACHINE\SOFTWARE\PowerMAN`
3. Create a `REG_SZ` (string) value called `DebugFile`
4. Set the value to the name of the desired file. For instance:

```
[HKEY_LOCAL_MACHINE\SOFTWARE\PowerMAN]
"DebugFile"="c:\powerman.log"
```

5. Restart the PowerMAN service (or restart the computer) with the following command:

```
POWERMAN RESTART
```

PowerMAN will log useful information every second to the specified log file. After a sufficient period has elapsed (ideally at least as long as the desired idle timeout plus a margin of a few minutes) proceed as follows to examine the log:

1. Stop the PowerMAN service with the following command:

```
POWERMAN STOP
```

2. Open the file. For instance:

```
NOTEPAD C:\WINDOWS\SYSTEM32\POWERMAN.LOG
```

The log file contains the following information:

| Field | Meaning |
|---------------------|---|
| Current Time | The time of the log entry. A log entry is produced every second |
| Busy% | The average level of CPU activity during the last second |
| Idle% | The current level of idleness. NB: This is the internal value calculated by Windows and is NOT the same as 100 minus Busy% |
| MaxIdle% | The maximum amount of idleness. Windows allows the idle timer to |

| | |
|------------------------------|--|
| | <p>decrement whilst the current Idle% level is above this value.</p> <p>Typically this is 100% when no idle action is configured and 82% when an idle action is configured and the idle sensitivity is 50%. This value can be lowed (making the system more likely to reach idle) by reducing the idle sensitivity setting</p> |
| LastInput | The time of last user (mouse / keyboard input). If this value is frequently changing this indicates that the system is receiving phantom input (usually from a faulty or over sensitive mouse) |
| Remain Time (seconds) | <p>The amount of time remaining before the system is considered idle. This decreases (usually in 15s intervals) whilst the Idle% is above MaxIdle%. Where there is intermittent background activity (or user input) this value can decrease but will reset to the initial value before reaching 0.</p> <p>NB: Windows XP uses a negative value to indicate that the system is not using the idle timer. This happens when no idle action/timeout is configured</p> |
| Users | The number of users currently logged onto the computer |
| State | The internal Windows System Execution State flags. Any value other than 0x0 indicates that the system is being artificially prevented from entering idle state by a program |

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An example log file, where an idle timeout or action is not specified, would appear as follows:

Log started 20080604 110319

| CurrentTime | Busy | Idle | MaxIdle | LastInput | Remain | Users | State |
|-----------------|------|------|---------|-----------------|--------|-------|-------|
| 20080604 110319 | 100 | 58 | 100 | 20080604 110318 | -15s | 1 | 0x0 |
| 20080604 110320 | 19 | 58 | 100 | 20080604 110318 | -15s | 1 | 0x0 |
| 20080604 110321 | 0 | 58 | 100 | 20080604 110318 | -15s | 1 | 0x0 |

Note that the MaxIdle% is 100% and the remaining timeout value is -15 (The timer isn't running).

A common scenario is that a faulty (or poorly designed) mouse may introduce phantom inputs. This can be exacerbated by the presence of florescent lighting. Note that the LastInput field changes in every entry. This results in the idle timer being reset and therefore the system will never idle. In such a situation the log may appear as follows:

| CurrentTime | Busy | Idle | MaxIdle | LastInput | Remain | Users | State |
|-----------------|------|------|---------|-----------------|--------|-------|-------|
| 20080604 110319 | 0 | 58 | 82 | 20080604 110319 | 1200s | 1 | 0x0 |
| 20080604 110320 | 1 | 58 | 82 | 20080604 110320 | 1200s | 1 | 0x0 |
| 20080604 110321 | 0 | 58 | 82 | 20080604 110321 | 1200s | 1 | 0x0 |

Another typical scenario occurs when a program artificially prevents the system from reaching the idle state. You can determine if this is happening by examining the **State** field. Any value other than 0x0 indicates that the system is currently being prevented from idling. For instance

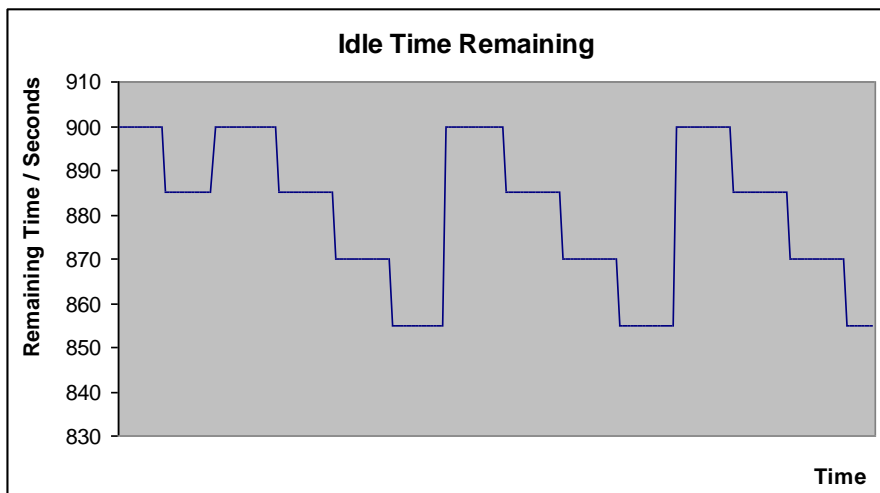
| | | | | | | | |
|-----------------|---|----|----|-----------------|-------|---|-----|
| 20080604 110321 | 0 | 58 | 82 | 20080604 110321 | 1200s | 1 | 0x7 |
| 20080604 110322 | 0 | 58 | 82 | 20080604 110321 | 1200s | 1 | 0x1 |

Finally, another scenario may be that an intermittent background process (such as the screen saver) may be preventing the system from reaching the idle state. In this situation the remaining idle time may appear to initially decrease but will frequently reset to the initial value. This may appear as follows (intermediate records have been omitted for brevity):

| | | | | | | | |
|-----------------|----|----|----|-----------------|--------------|---|-----|
| 20080604 100003 | 10 | 97 | 82 | 20080604 095736 | 1200s | 0 | 0x0 |
| ... | | | | | | | |
| 20080604 100034 | 0 | 98 | 82 | 20080604 095736 | 1185s | 0 | 0x0 |
| ... | | | | | | | |
| 20080604 100049 | 8 | 92 | 82 | 20080604 095736 | 1170s | 0 | 0x0 |
| ... | | | | | | | |
| 20080604 100104 | 0 | 90 | 82 | 20080604 095736 | 1155s | 0 | 0x0 |
| ... | | | | | | | |
| 20080604 100134 | 0 | 79 | 82 | 20080604 095736 | 1200s | 0 | 0x0 |
| ... | | | | | | | |
| 20080604 100159 | 0 | 98 | 82 | 20080604 095736 | 1185s | 0 | 0x0 |
| ... | | | | | | | |
| 20080604 100239 | 8 | 92 | 82 | 20080604 095736 | 1170s | 0 | 0x0 |
| ... | | | | | | | |
| 20080604 100304 | 0 | 90 | 82 | 20080604 095736 | 1155s | 0 | 0x0 |
| ... | | | | | | | |
| 20080604 100334 | 0 | 79 | 82 | 20080604 095736 | 1200s | 0 | 0x0 |

NB: Some versions of PowerMAN include additional fields in the debug log file. If you need more information on these please contact Technical Support.

It can sometimes help to plot the idle time remaining field using a charting tool such as Microsoft Excel. This may help you visualise the timer behaviour and understand what is happening. Often this can result in a 'saw-tooth' pattern as the timer periodically resets before reaching zero. This is a classic sign of 'PC Insomnia':



Other Deployment Resources

The following Microsoft resources may also be useful:

[302430](#) How to assign software to a specific group by using Group Policy

[224330](#) Assigning a Windows Installer Package with minimal interaction

[257718](#) How to create a third-party Microsoft Installer package (MSI)

[278472](#) Packages assigned to computers with Group Policy are not installed

Appendix A – PowerMAN Command line options

PowerMAN supports the following command line options. These may be used by an administrator to manually configure the service and report on the current installation status:

| Command | Meaning |
|--------------------|---|
| Install | Install the PowerMAN service. For example: <code>POWERMAN INSTALL</code> |
| Remove | Remove (uninstall) the PowerMAN service (also stops if running) |
| Start | Start the PowerMAN service (also installs if not already installed) |
| Stop | Stop the PowerMAN service |
| Restart | Restart the PowerMAN service |
| Status | Display the current service status |
| Makeguid | Generate a unique GUID value. This may be used for the SiteGUID |
| License | Check the current PowerMAN license key and expiry (if applicable) |
| Forceupload | Force any logged data to be uploaded immediately. |
| Hibercheck | Test system ability to hibernate and automatically resume. |
| Sleepcheck | Test system ability to sleep and automatically resume. |
| Info | Display various power related information. This is intended for use by Technical Support |
| Supportdump | Generate a CAB file containing PowerMAN settings and debug information. This is intended for Technical Support use. |
| Help | Display the command line help |

Appendix B – PowerMAN Configuration with Novell ZENworks

Recent versions of Novell’s ZENworks product directly support deployment and configuration of applications using a Group Policy based method. This approach is similar to the native Windows Group Policy method and is the simplest approach for deploying PowerMAN in a Novell based environment.

The following section describes the basic approach for ZENworks 6.5. A similar method may be used for other versions of ZENworks. This method assumes the **Novell ZENworks agent** to be already deployed and the **Workstation Manager** component is enabled.

To configure PowerMAN using ZENworks 6.5 proceed as follows:

1. Locate the PowerMAN **PowerMAN5.adm** file supplied with PowerMAN



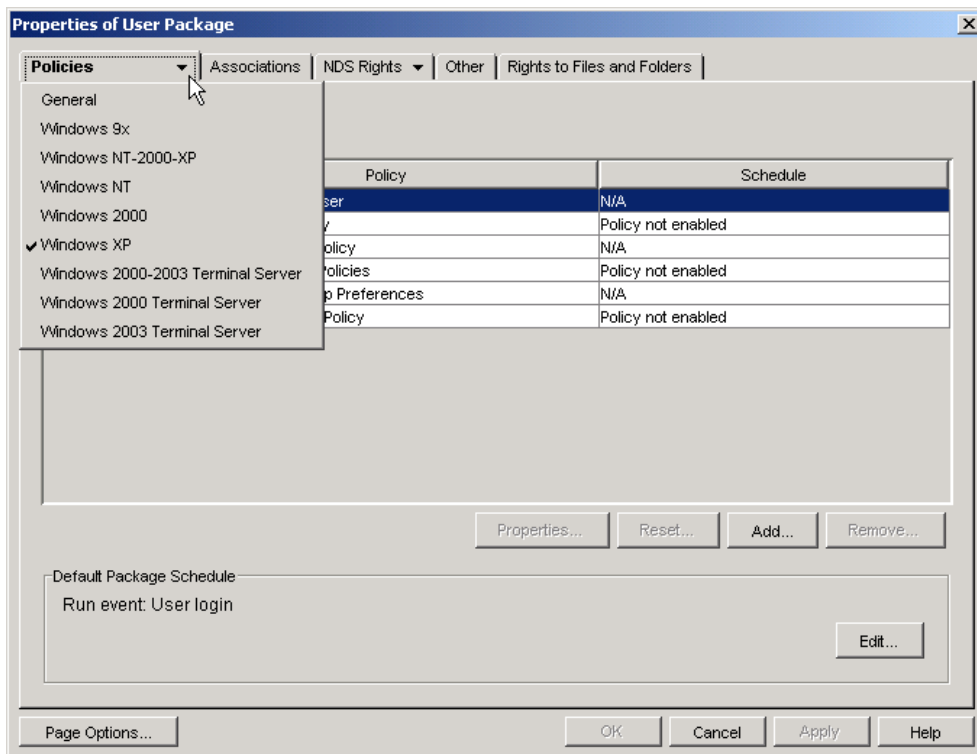
2. Open the **ZENworks ConsoleOne** tool and locate the container where you wish to create the PowerMAN policy. This should be an appropriate container for policies based upon your tree design.

NB: If this is your first policy then the container where the workstations you wish to manage are located may be an appropriate place to start.

3. Right Click and select **New Policy Package**
4. Select **Workstation Package** and click **Next**



- Click the **Policies** tab and select the operating system(s) you wish to deploy PowerMAN to:



Remember: It is strongly recommended that you create a separate policy for each supported operating system. Whilst ZENworks does allow a unified (multiple operating system) policy to be created Novell recommend that the policy for each operating system be configured from a client running that operating system. In other words the Windows XP policy should be configured on a Windows XP client and the Windows Vista policy should be configured on a Windows Vista client.

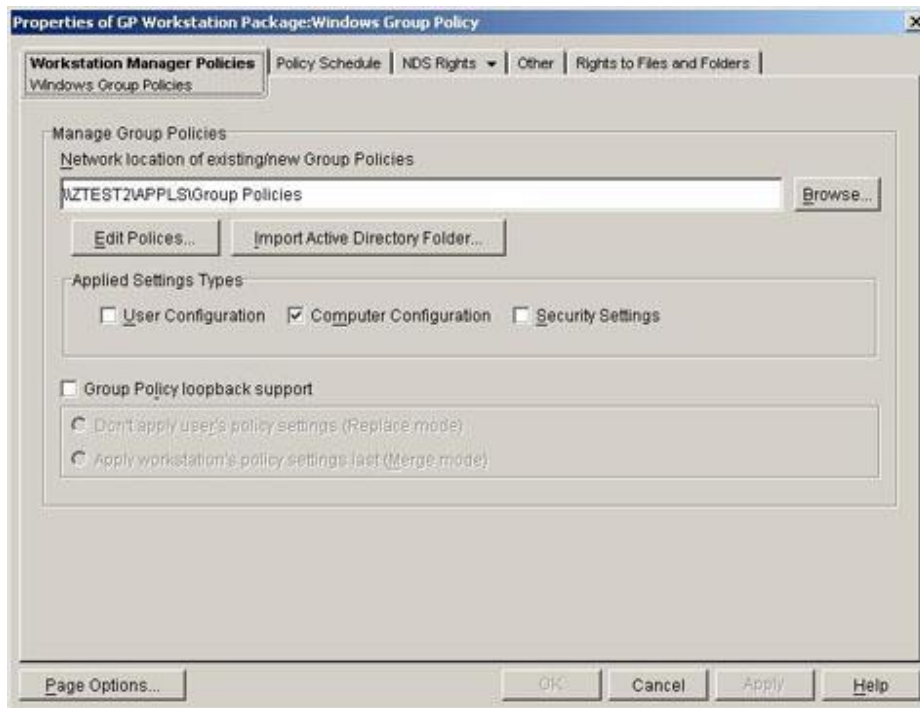
- Tick the **Windows Group Policy** option and click **Properties**



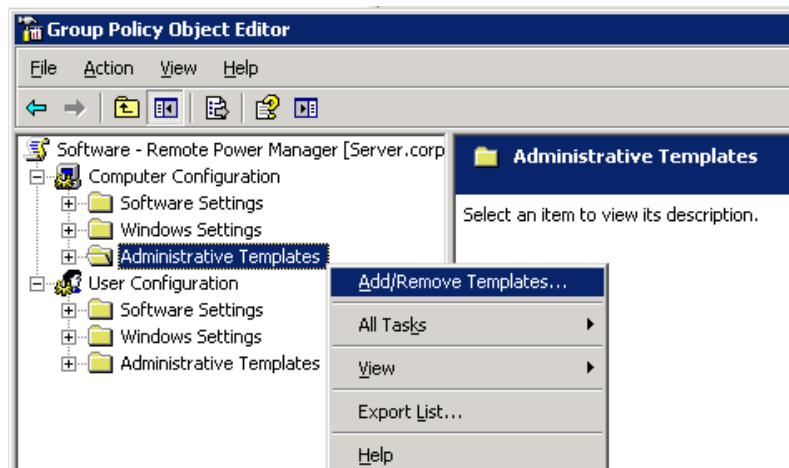
- Tick **Computer Configuration**
- Click **Browse** and locate the UNC path where you wish to store the resulting .POL file.

PowerMAN Power Manager v5.3

NB: A UNC path should be used to avoid problems with drive letter mapping. This path should be accessible to workstation objects that you wish to configure.



9. Select **Edit Policies**. The **Windows Group Policy Object Editor** will open
10. Navigate to the **Computer Configuration / Administered Templates**, right click and select **Add/Remote Templates**:



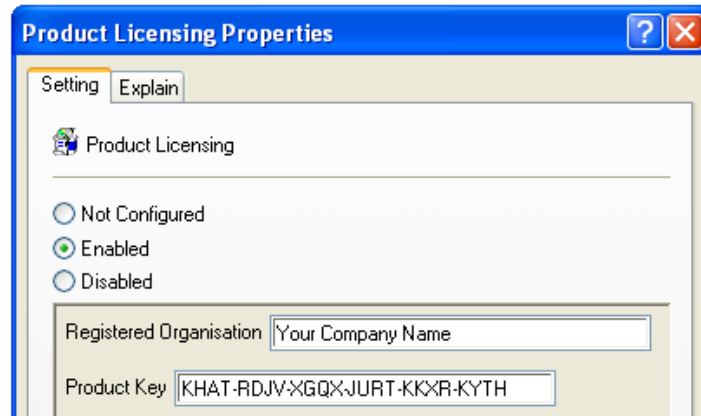
11. Click **Add** and locate the **PowerMAN5.adm** file supplied.

NB: It may be helpful to remove the other administrative templates present using the **Remove** button. These are not required for PowerMAN.

12. The **Administrative Templates** section should now contain a section for **PowerMAN Power Management** (other sections may be present depending on server configuration). Select the **PowerMAN Power Management** section and configure the appropriate PowerMAN settings.

PowerMAN Power Manager v5.3

13. For instance, to configure the license settings select **Product Licensing**, right click and select **Properties**
14. Select **Enabled**, carefully enter the product details supplied with the software, and click **Ok**



15. When the appropriate settings have been configured close the Group Policy Object Editor and return to the ZENworks package settings
16. Open the **Policy Schedule** tab, drop down **Schedule Type**, and select **Event**
17. Configure the policy to apply on the **Service Startup** event.
18. Open the **Associations** tab and select the container(s) you wish to associate this settings package with.
19. Click **OK** to complete the package configuration

There is further information about Group Policy based workstation packages on the Novell website:

<http://www.novell.com/documentation/zenworks65/?page=/documentation/zenworks65/dmadmin/data/a777rvi.html>

Appendix C – PowerMAN Configuration with RM Community Connect 3

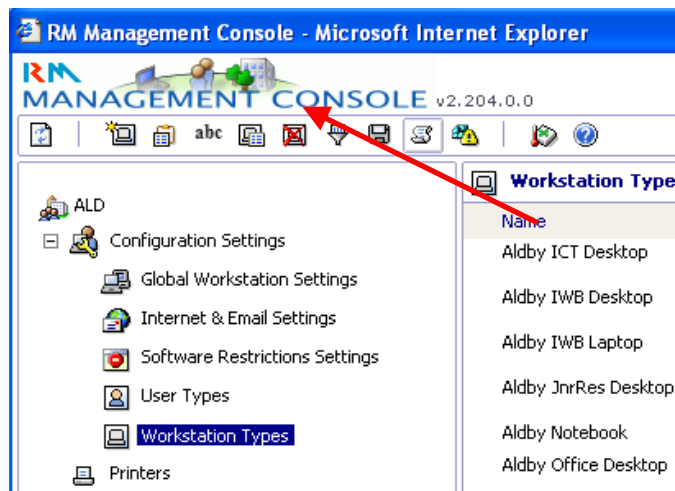
The following section describes the basic configuration approach for RM Community Connect 3. A similar method may be used for other versions of Community Connect (CC).

To configure PowerMAN using RM Community Connect proceed as follows:

1. Locate the PowerMAN ADM file and copy it to the location where group policies are stored on the server.

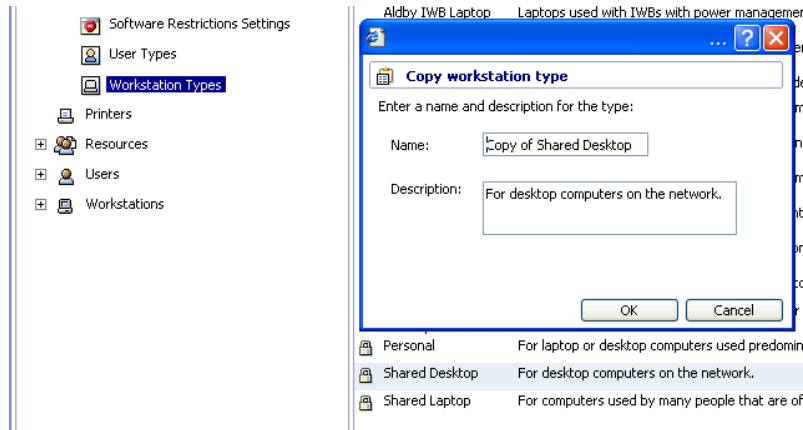
NB: On a workstation, this folder is normally L:\Type Manager\ADM (e.g. the RMMManage share) or if at the server, it is D:\RMDelivery\RMMManage\Type Manager\ADM.

2. Login to the RM Management Console (RMMC) as System Admin.
3. Expand Configuration settings and click on 'Workstation Types' and then on 'Type Options' at the top (4th button from the right).



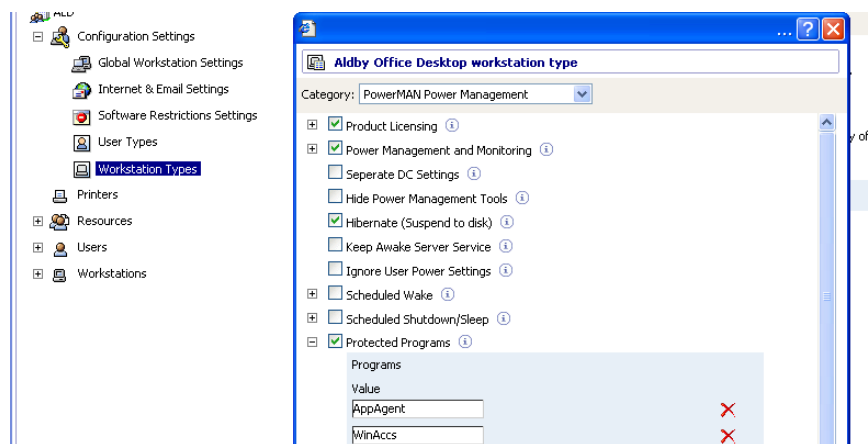
4. A drop down list will appear. Tick the new policy and click OK.
5. The new policy will be applied to a group of computers. To create a workstation type (it is not possible to change the properties of standard RM workstation types), select an appropriate workstation type to copy, e.g. Shared Desktop. Right-click on it, select copy and then give the workstation type a meaningful name.

Hint: Avoid using a name with something which is exactly the same as your 3-letter establishment code as this can sometimes cause confusion in Active Directory. In the example above and below, the code is ALD but workstation type names start with Aldby.



6. Edit the properties of the new workstation type. Double click the new type and select the PowerMAN Power Management option from the drop-down list.
7. Configure the product licence details and other PowerMAN settings as required.

Hint: It can be helpful to configure 'AppAgent' and 'WinAccs' as protected programs. This will avoid the computers suspending whilst lengthy updates are being installed.



8. Finally select a workstation computer to test the policy. Apply the policy to this workstation by assigning that workstation to the new workstation type. To do this locate the PC in the RMMC, select it's properties, and on the General page, change the workstation type to be the new one. Restart the computer (a second reboot may sometimes be required) and the policy should be applied.

Hint: A useful tip is to make a change to the screen-saver, or the colour of the pre-login desktop at the same time as you are making other policy. Then when you see that, you know that the other policy will be in effect, too.

Appendix D – PowerMAN Policy Settings Reference

PowerMAN is designed, primarily, for configuration with the Microsoft Windows group policy tools supplied with all recent versions of Windows Server. An Administrative Template file is supplied to simplify this process.

PowerMAN may also be configured by manually creating a suitable settings and importing them into the system registry of the deployed workstation computers. This section documents the supported policy settings and their default values. In a few cases options are available via the registry are deliberately omitted from the associated ADM file. These options are intended for advanced configuration and troubleshooting.

General Information

Unless otherwise noted all settings are of type REG_DWORD. True is indicated by 1. False is indicated by 0. Where no value is specified for a setting (it is missing) a sensible default value is assumed.

The following are valid values for settings marked **_ACTION**:

| _ACTION Meaning | REG_DWORD Value |
|-------------------------------|------------------------|
| PowerActionNone | 0 |
| PowerActionSleep | 2 |
| PowerActionHibernate | 3 |
| PowerActionReboot | 5 |
| PowerActionShutdownOff | 6 |

NB: Some policies only support a subset of the above actions

The following are valid values for settings marked **_STATE**:

| _STATE Meaning | REG_DWORD Value |
|-----------------------------|------------------------|
| PowerSystemWorking | 1 |
| PowerSystemSleeping1 | 2 |
| PowerSystemSleeping2 | 3 |
| PowerSystemSleeping3 | 4 |
| PowerSystemHibernate | 5 |
| PowerSystemShutdown | 6 |

The following table may be useful for calculating values expressed in seconds:

| Time in seconds | REG_DWORD Value (Decimal) |
|------------------------|----------------------------------|
| Disabled | 0 |
| 1 Minute | 60 |
| 5 Minutes | 300 |
| 60 Minutes | 3600 etc |

Product Licensing

The product license settings are stored in **HKLM\SOFTWARE\Policies\PowerMAN:**

| Registry Setting Name / Type | Meaning |
|---|---|
| RegisteredOrganisation REG_SZ e.g. Example Supplies Ltd | Organisation name supplied with the PowerMAN product key. This forms part of the product key and must be entered exactly. |
| RegisteredProductKey REG_SZ e.g. KHAT-RDJV-XGQX-JURT-KKXR-KYTH | The product key supplied with PowerMAN. This is exactly six groups of four characters separated by five dashes. |

Power Management and Monitoring (Reporting)

The reporting settings are stored in **HKLM\SOFTWARE\Policies\PowerMAN:**

| Registry Setting Name / Type | Meaning |
|--|--|
| SiteGUID REG_SZ e.g. {c0388a36-0826-4566-ba64-c22a96cb7863} | Unique site identity used to track a group of computers that are managed as a single entity. This value can be generated with the <code>Makeguid</code> command line option. |
| LogServer REG_SZ e.g. pmstats.org | The address of the logging server. This can be blank if management reporting information is not required. The standard logging server is pmstats.org |
| LogServerPort REG_DWORD e.g. 443 | The port number of the logging server. This is usually either 80, 443 or 8080. The default pmstats.org server port is 443 . |
| LogProxy REG_SZ e.g. 192.168.1.1 | The address of the local proxy server that PowerMAN must use to send management information to the logging server. This can be blank if a proxy server is not required. |
| LogProxyPort REG_DWORD e.g. 8080 | The port number of the proxy server. This is typically 8080. This value has no effect if a proxy server address is not defined. |
| CacheBackup REG_SZ | Some sites frequently reinstall (sometimes called re-image) workstations to ensure a smooth user experience. In such sites the most recent power usage information can be lost during a re-installation. This can be avoided by configuring PowerMAN to store a backup of the usage information. It is the responsibility of the system administrator to ensure that this file is protected during the |

| | |
|---|---|
| e.g. %windir%\system32\logfiles\PowerUsage.xml | reinstallation process by either excluding it from being over-written or by moving it to a save location. This seeing must refer to a <i>local</i> path. |
| HidIdentity REG_DWORD 0=Disable 1=Enable | Do not report the workstation name (and MAC address and OU membership if applicable) to the reporting server. This option may be required to meet privacy requirements in some jurisdictions. |
| UploadLiveStatus REG_DWORD 0=Disable 1=Enable | Report live power management status data. |
| UploadHardwareInfo REG_DWORD 0=Disable 1=Enable | Report hardware details of workstation. |

Miscellaneous Configuration

PowerMAN supports the following miscellaneous features on a per-machine basis. These are stored in **HKLM\SOFTWARE\Policies\PowerMAN**:

| Registry Setting Name / Type | Meaning |
|--|---|
| SeperateDCPolicy REG_DWORD 0=Disable 1=Enable | Allow separate DC settings to be configured. When disabled any DC settings are ignored. This option should be set to not-configured or disabled except when configuring PowerMAN for use with portable computers. If separate DC settings are used care should be taken to ensure they are compatible with the AC settings. |
| EnableHibernate REG_DWORD 0=Disable 1=Enable | Enable support for the hibernate (S4) power saving option. This is the same as ticking the hibernate option in the local control panel applet. If hibernate is not enabled attempts to hibernate will normally result in a suspend to RAM (S1-S3) instead. |
| HidePowerOptions REG_DWORD 0=Disable 1=Enable (hide) | Hide the Power Management control panel applet and the Screen Saver configuration tab of the display properties applet. See notes below. |
| IgnoreUserSettings REG_DWORD 0=Disable 1=Enable | Ignore any user specific power settings. When a user is logged in the default policy settings will apply. When no user is logged in the No User settings will apply. |
| IgnoreUserOverride | Ignore user opt-out configuration. This option also removes the user opt-out option from the |

| | |
|--|---|
| REG_DWORD 0=Disable 1=Enable | user interface menu. |
| DiscardUserOverride REG_DWORD 0=Disable 1=Enable | Discard user opt-out selection upon logout / reboot. |
| DiscardUserKeepAwake REG_DWORD 0=Disable 1=Enable | Discard user keep awake selection upon logout / reboot. |
| AllowWakeTimersAC REG_DWORD 0=Disable 1=Enable | Globally enable/disable hardware wake-up timers on AC power |
| AllowWakeTimersDC REG_DWORD 0=Disable 1=Enable | Globally enable/disable hardware wake-up timers on battery power |
| ServerServiceKeepAwake REG_DWORD 0=Disable 1=Enable | When enabled and the Server service is running, the system will not sleep, hibernate or shutdown. This option should normally be either not configured or disabled unless specifically required as incorrect configuration will result in increased energy consumption. This option has no effect if the Server service is not running. |

Scheduled Events

PowerMAN supports both scheduled wake and shutdown features. These are stored in the following Registry locations respectively:

HKLM\SOFTWARE\Policies\PowerMAN\AutoShutdownX
HKLM\SOFTWARE\Policies\PowerMAN\AutoWakeX

where X is a number from 1-n.

Days for auto-shutdown/wake are configured using the following bit mask values:

| DAY | REG_DWORD Value |
|-----------|-----------------|
| Sunday | 1 |
| Monday | 2 |
| Tuesday | 4 |
| Wednesday | 8 |
| Thursday | 16 |
| Friday | 32 |
| Saturday | 64 |

To determine the value for a specific combination of days add the required values together:

For example:

Weekdays (Monday-Fri) = 62
 Weekends (Sat/Sun) = 65
 Everyday (Sun-Sat) = 127

The supported scheduled wake settings are as follows:

| Registry Setting Name / Type | Meaning |
|---|---|
| AutoWakeDays REG_DWORD Sun=1, Mon=2, Tues=4...Sat=64 etc e.g. 62 (Monday-Fri) | The weekdays that the scheduled wake policy will apply (typically All or Mon-Fri). This option may be extended by editing the ADM file. See appendix for further details. |
| AutoWakeDates REG_SZ CSV separated list of days of the month e.g. 1, 10 | The days of the month that the scheduled action will apply. This works in combination to the weekdays specified and may be left empty if not required. |
| AutoWakeLocalTime REG_SZ Time in hh:mm:ss format (seconds are optional) e.g. 08:55 | The local time that the computer is scheduled to wake. Typically this value is set to be a few minutes before the user requires the computer. Remember that, depending on other power settings, the computer may shutdown or sleep if no activity occurs within the timeout period. Policy is enabled by presence of both valid |

| | |
|--|---|
| | AutoWakeDays and AutoWakeLocalTime settings |
|--|---|

Similarly the supported scheduled shutdown/sleep settings are as follows:

| Registry Setting Name / Type | Meaning | | | | | | |
|---|--|---------------------------------|---|------------------------------|---|---------------------------------|------------------------------------|
| AutoShutdownDays REG_DWORD Sun=1, Mon=2, Tues=4...Sat=64 etc e.g. 62 (Monday-Fri) | The weekdays that the scheduled action will apply (typically All or Mon-Fri). This option may be extended by editing the ADM file. See appendix for further details. | | | | | | |
| AutoShutdownDates REG_SZ CSV separated list of days of the month e.g. 1, 10 | The days of the month that the scheduled action will apply. This works in combination to the weekdays specified and may be left empty if not required. | | | | | | |
| AutoShutdownLocalTime REG_SZ Time in hh:mm:ss format (seconds are optional) e.g. 18:00 | The local time that the computer is scheduled to enter the specified state. Typically this value is set to be a few minutes after the closing of a public access area. | | | | | | |
| AutoShutdownMode REG_DWORD <table border="1" data-bbox="188 1317 730 1415"> <tr> <td>0</td> <td>Ignore action if user logged on</td> </tr> <tr> <td>1</td> <td>Warn user. Allow user cancel</td> </tr> <tr> <td>2</td> <td>Warn user. No allow user cancel</td> </tr> </table> e.g. 1 | 0 | Ignore action if user logged on | 1 | Warn user. Allow user cancel | 2 | Warn user. No allow user cancel | How to apply the specified action. |
| 0 | Ignore action if user logged on | | | | | | |
| 1 | Warn user. Allow user cancel | | | | | | |
| 2 | Warn user. No allow user cancel | | | | | | |
| AutoShutdownAction REG_DWORD This must be one of the value _ACTION values noted above. e.g. 3 (PowerActionHibernate) | The action to take. This may be sleep, hibernate, reboot or power off. The policy is enabled by the presence of a valid combination of all four AutoShutdown policy settings. | | | | | | |
| AutoShutdownAllowResume REG_DWORD 0=Disable 1=Enable | Allow system to wake from one power saving state to transition to another. If this feature is not enabled the system will remain in the other state and ignore the scheduled shutdown/sleep policy. This feature is typically used in sites that have a lower sleep policy during the daytime | | | | | | |

| | |
|---|---|
| | and wish to transition to a deeper state at night time. As noted elsewhere this feature requires that the hardware correctly supports a scheduled wake operation. No all hardware is capable of doing this and some hardware incorrectly reports that it supports this. |
| AutoShutdownOverrideMode REG_DWORD 0=Operation is not inhibited 1=Protected files/programs inhibit 2=Any application may inhibit | Allow other applications (including protected files and programs) to inhibit the shutdown/sleep operation. |

Global (All User) Power Settings

PowerMAN supports the following global power management features on a per-machine basis. These are stored in **HKLM\SOFTWARE\Policies\PowerMAN\AllUsers**:

| Registry Setting Name / Type | Meaning |
|---|--|
| Enable REG_DWORD 0=Disable 1=Enable (default) | Enable or disable All User Power settings. This is enabled by default. Setting this value to 0 can temporarily disable these settings. This is the same as deleting the HKLM\SOFTWARE\Policies\PowerMAN\AllUsers registry key. |
| LidOpenAcState REG_DWORD This must be one of the value _STATE values noted above. e.g. 0 (PowerSystemWorking) | The action to take, when running on AC power, when the computers lid (if present) is opened. Support for this feature may not be present on all hardware. |
| LidOpenDCState REG_DWORD | As above but applies when running on DC power |
| PowerButtonAcAction REG_DWORD This must be one of the value _STATE values noted above. e.g. 4 (PowerSystemHibernate) | The action to take, when running on AC power, when the power button is pressed. |
| PowerButtonDcAction REG_DWORD | As above but applies when running on DC power |
| SleepButtonAcAction REG_DWORD | The action to take, when running on AC power, when the sleep button (if present) is pressed. |
| SleepButtonDcAction | As above but applies when running on DC power |

| | |
|--|---|
| REG_DWORD | |
| LidCloseAcAction REG_DWORD | The action to take, when running on AC power, when the computers lid (if present) is shut. Support for this feature may not be present on all hardware. |
| LidCloseDcAction REG_DWORD | As above but applies when running on DC power |
| EnablePasswordOnWake REG_DWORD 0=Disable 1=Enable | Require a password when the computer wakes from sleep or hibernate. This should normally be enabled. |
| EnableShowPowerMeter REG_DWORD 0=Disable 1=Enable | Show the power meter on the task bar. This policy should generally only be enabled for laptop computers. |
| EnableDimVideoDc REG_DWORD 0=Disable 1=Enable | Dim the screen when running on DC power. This policy is typically only supported by some laptop computers. |

User, Default and No User Power Settings

PowerMAN supports three different types of power settings. All support the same options but are stored in different registry locations:

1. User specific settings are stored in **HKCU\SOFTWARE\Policies\Powerman\User**
2. No User settings (for the logon prompt when nobody is logged on) are stored in **HKLM\SOFTWARE\Policies\Powerman\NoUser**.
3. Default settings (for users without their own specific configuration) are stored in **HKLM\SOFTWARE\Policies\Powerman\DefaultUser**. These are used for every use and the logon prompt 'user' unless another specific policy is applied

| Registry Setting Name / Type | Meaning |
|---|---|
| LogoutAcTimeoutSeconds REG_DWORD e.g. 300 (5 minutes) | The inactive time, in seconds, when running on AC (mains Power), that will trigger the user to be logged about. This time is measured since the last user activity (mouse or keyboard input). This setting is not available for the NoUser policy. |
| LogoutDcTimeoutSeconds REG_DWORD | As above but applies when running on battery power. This setting is not available for the NoUser policy. |
| LogoutForce REG_DWORD 0=Disable 1=Enable | When enabled this option will force the logout to occur. If this setting is not enabled an application may veto the logout. Typically applications do this to prompt the user to save unsaved work therefore, if this setting is enabled, user data loss may occur. This setting is enabled for |

| | | | | | | | |
|---|--|------|---|---------|---|----------|--|
| | <p>environments where data integrity is not a concern. This setting is enabled by default and is hidden in the standard ADM/ADMX file distribution.</p> <p>This setting is not available for the NoUser policy.</p> | | | | | | |
| <p>IdleAcAction</p> <p>REG_DWORD</p> <p>e.g. 3 (PowerActionHibernate)</p> | <p>The action to take (shutdown, suspend, hibernate, nothing) upon entering the idle state</p> <p>NB: This must be one of the value _ACTION values noted above.</p> | | | | | | |
| <p>IdleDcAction</p> <p>REG_DWORD</p> | <p>The inactive time in seconds, when running on AC (mains power), that will trigger the idle action.</p> | | | | | | |
| <p>IdleAcSensitivity</p> <p>REG_DWORD</p> <p>e.g. 50 (Windows default)</p> | <p>The level of sensitivity applied by Windows to detect system idle. The Windows default is 50%. Some systems fail to reach idle due to background system activity. In this situation it can be useful to lower this value. A value of 5% is recommended. This must be between 5% and 90%</p> | | | | | | |
| <p>IdleDcTimeoutSeconds</p> <p>REG_DWORD</p> | <p>Same as IdleAcAction but applies when running on battery power.</p> | | | | | | |
| <p>IdleDcTimeoutSeconds</p> <p>REG_DWORD</p> | <p>As above</p> | | | | | | |
| <p>IdleDcSensitivity</p> <p>REG_DWORD</p> | <p>As above</p> | | | | | | |
| <p>VideoTimeoutAcSeconds</p> <p>REG_DWORD</p> | <p>The inactive time in seconds, when running on AC power, before switching the console monitor off.</p> | | | | | | |
| <p>VideoTimeoutDcSeconds</p> <p>REG_DWORD</p> | <p>Same as VideoTimeoutAcSeconds but applies when running on battery power.</p> | | | | | | |
| <p>HDDTimeoutAcSeconds</p> <p>REG_DWORD</p> | <p>The inactive time in seconds, when running on AC power, before switching the hard disk off.</p> <p>NB: This policy may not be very effective on many systems that perform frequent background tasks. See troubleshooting section for further information.</p> | | | | | | |
| <p>HDDTimeoutDcSeconds</p> <p>REG_DWORD</p> | <p>Same as HDDTimeoutAcSeconds but applies when running on battery power</p> | | | | | | |
| <p>CPUThrottleAc</p> <p>REG_DWORD</p> <table border="1" data-bbox="188 1877 683 1973"> <tr> <td>0</td> <td>None</td> </tr> <tr> <td>2</td> <td>Degrade</td> </tr> <tr> <td>3</td> <td>Adaptive</td> </tr> </table> <p>e.g. 3 (Adaptive)</p> | 0 | None | 2 | Degrade | 3 | Adaptive | <p>The processor throttling policy to apply when running on AC power.</p> <p>Adaptive – Match performance to demand</p> <p>Degrade – Maximize energy saving by reducing CPU performance</p> <p>None – Maximize performance (increased energy consumption)</p> |
| 0 | None | | | | | | |
| 2 | Degrade | | | | | | |
| 3 | Adaptive | | | | | | |

| | |
|--|---|
| | <p>Processor throttling is not available on all hardware and is ignored if it is not supported.</p> <p>Typically this setting should be set to Adaptive when a user is present but may be set to Degrade when no user is logged on.</p> |
| <p>CPUThrottleDc REG_DWORD</p> | <p>As per CPUThrottleDC but applies when running on battery power</p> |

Policy Enforcement / Anti-Insomnia Settings

PowerMAN allows the administrator to enforce the specified idle settings. These can be used to ensure that the specified idle action will occur and cannot be suppressed by Windows or another program. These are necessary on some systems where the installed software may periodically reset the Windows idle timer or otherwise prevent the system from idling.

| Policy Enforcement Setting | Meaning |
|--|---|
| <p>ForceldleAcExtraTimeoutSeconds REG_DWORD e.g. 300 (5 minutes)</p> | <p>The amount of time, in addition to the specified idle timeout after which the idle action will be forced.</p> |
| <p>ForceldleDcExtraTimeoutSeconds REG_DWORD</p> | <p>As above but applies when running on battery power.</p> |

Protected Object Settings

PowerMAN allows the administrator to specify programs and files that, when running or present respectively, will prevent the system from enter the idle state. These are specified by listing creating a value in the following registry keys. The name of the value is not important (Windows numbers them when configured with the administrative template)

- HKLM\SOFTWARE\Policies\PowerMAN\ProtectedFiles
- HKLM\SOFTWARE\Policies\PowerMAN\ProtectedPrograms

| Protected Setting | Meaning |
|--|---|
| <p>ProtectedPrograms REG_SZ e.g. CMD</p> | <p>Specifies a list of programs that, when running, require the system to remain awake.</p> <p>Program names should be specified without a file extension.</p> <p>e.g. CMD and <i>not cmd.exe</i></p> |
| <p>ProtectedFiles REG_SZ e.g. C:\CONDOR\ACTIVE.LOG</p> | <p>As above but applies to files. When a file in the protected list exists PowerMAN will ensure that the system remains awake.</p> <p>Files should be fully qualified and include a file extension.</p> <p>e.g. C:\CONDOR\ACTIVE.LOG</p> |

Resume Configuration Settings

By design Windows will return to the previous low power state two minutes after an automatic resume if there is no user activity. On some systems application behaviour may interfere with this behavior or it may be undesirable.

PowerMAN's **Resume Configuration** feature allows this Windows feature to be inhibited where necessary:

| Resume Configuration Setting | Meaning |
|--|---|
| ResumeDisableResuspendSeconds REG_DWORD | <p>The inactive time, in seconds, during which PowerMAN will prevent the system from returning to the previous low power state.</p> <p>If no user activity occurs during this period PowerMAN will subsequently allow the PC to return to the previous low power state. This process is terminated immediately upon any user activity</p> |
| ResumeActivateMonitor REG_DWORD 0=Disable 1=Enable *This feature is not supported on some hardware platforms or graphics cards. | <p>Allow the display to be turned on following an automatic system resume.</p> |

Debugging / Advanced Settings

The following debugging settings are supported. These settings are located in **HKLM\SOFTWARE\Policies\Powerman**. These are intended primarily for resolving problems under the instruction of Technical Support.

| Setting | Meaning / Supported Values |
|---|--|
| IgnoreSystemActive REG_DWORD 0=Disable 1=Enable e.g. 1 | <p>When enabled this option will ignore other related tools (such as the legacy PowerCONFIG and PowerSTART) and protected objects. This means that non-user activity will not be reported and will be counted as idle time. Use this option to enforce a policy regardless of these tools.</p> |
| MaskNonInteractiveSessions REG_DWORD 0=Disable 1=Enable e.g. 1 | <p>Ignore user input (mouse / keyboard) for policy enforcement when nobody is logged on. This feature is intended to workaround problem hardware such as "chatty" optical mice.</p> |
| MaskUserInterfaceRecentEvents | <p>Disable UI notification of recent power management events. This prevents display of</p> |

| | |
|--|--|
| <p>REG_DWORD</p> <p>0=Disable 1=Enable</p> <p>e.g. 1</p> | <p>the orange status icon.</p> |
| <p>HostPollMS</p> <p>REG_DWORD</p> <p>e.g. 60000</p> <p>Note: This value is in milliseconds</p> | <p>How often PowerMAN checks the current power status. This should happen at least once per minute. The default setting is 60 seconds.</p> |
| <p>PolicyUpdateMS</p> <p>REG_DWORD</p> <p>e.g. 600000</p> <p>Note: This value is in milliseconds</p> | <p>How often PowerMAN updates the active power settings. Typically PowerMAN checks the system every 10 minutes. This option may be used to speed up (or slow down) this process. Warning: Values below 30s can have a very detrimental impact on system performance.</p> |
| <p>CacheDays</p> <p>REG_DWORD</p> <p>e.g. 28</p> | <p>Power data is normally cached for up to 28 days. This allows logging to continue when the client computer is off the network or the logging server is unavailable. This setting can be used to adjust this default value.</p> <p>The power logs are stored in HKLM\SOFTWARE\Powerman\Logs</p> |
| <p>RemoveCorruptPolicies</p> <p>REG_DWORD</p> <p>0=Disable 1=Enable (default)</p> | <p>Remove corrupt power policies.</p> <p>PowerMAN beta testing found a scenario where certain third party utility may create corrupt power policies. Such policies prevent PowerMAN from operating correctly and prevent Windows from correctly configuring power management. By default PowerMAN removes such invalid policies.</p> |
| <p>UploadTimeoutMS</p> <p>REG_DWORD</p> <p>e.g. 5000</p> <p>Note: This value is in milliseconds</p> | <p>How long PowerMAN will wait for the server before terminating an upload attempt. The default is 5 seconds</p> |
| <p>EventLoggingLevel</p> <p>REG_DWORD</p> <p>0 = Standard information only (default) 1 = Additional information 2 = All information (maximum verbosity)</p> | <p>The level of event logging detail required. This may be one of the supported values shown.</p> <p>Logging additional information may fill the event log and cause other events to be lost. This option should therefore only be enabled when required.</p> |

Appendix E - Alternative Configuration Method - Local Group Policy / Registry Settings

It can be time consuming and potentially error prone to manually create the required settings. It is recommended that the Group Policy / ADM method is used wherever possible. However, if this approach is not practical it is possible to use the ADM file on a **local computer** to generate a master configuration and then deploy this using the built-in Windows Registry tools. This **Local Group Policy** approach has the advantage that it will create a consistent and reliable configuration with less likelihood of errors.

To use the ADM file on a local PC proceed as follows:

1. Install Windows XP on a computer that is **not** a member of a domain. It is not necessary for the PowerMAN service to be installed on the computer.
2. Create a folder, for example C:\PowerMAN and place a copy of the PowerMAN5.adm file within the folder.
3. Launch the Microsoft Management Console (MMC.EXE)
4. Navigate to the File menu and select Add/Remove Snap-in
5. Click Add
6. Select Group Policy Object Editor and click Add
7. The snap-in will default to Local Computer mode. This is correct. Click Finish
8. Click Close and then Ok to return to the main MMC window
9. Expand Local Computer Policy
10. Select Administrative Templates
11. Right click and select Add/Remote Templates
12. Click Add and locate the Powerman5.adm file. When finished click Close
13. Configure the desired power settings as per the GPO method instructions
14. Save the snap-in for later reuse (this avoids repeating steps 4-12 again) by selecting File/Save As and selecting the filename Powerman5.msc
15. Exit the management console
16. Export the generated registry settings for deployment on other computers by using the following command to create a file called PM.REG:

```
REG EXPORT HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Powerman PM.REG
```
17. Deploy the settings to the required computers using your chosen deployment method. This could be one of the following:

- i.

```
REG IMPORT PM.REG
```

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ii. REGEDIT /S PM.REG

iii. Third party deployment tool

18. If you need to create additional settings the following small batch file may be helpful. This overwrites the locally cached copy of the PowerMAN5.adm file and launches the previously saved snap-in. This process is particularly necessary if a new version of the ADM file has been released (it is normally only copied to the %windir%\system32\grouppolicy\adm\ folder when the snap-in is first configured):

```
COPY powerman5.adm %windir%\system32\grouppolicy\adm\powerman5.adm
```

```
MMC powerman5.msc
```

Example Registry File

The following registry example contains the settings for a basic site with the following properties:

1. Site GUID is **{bf9d6144-02f1-4292-9f59-225fae4fd7de}**
2. Log server is **pmstats.org:443** (0x1BB in hexadecimal)
3. A Default policy applies that hibernates the system after 30 minutes (0x708 seconds) and turns off the monitor after 10 minutes (0x258 seconds)
4. A No User policy applies that powers off the computer after 10 minutes (0x258 seconds) when no user is logged on
5. Policy enforcement (anti-insomnia) that provides a 5 minute (0x12c seconds) grace period

Windows Registry Editor Version 5.00

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Powerman]
"SiteGUID"="{bf9d6144-02f1-4292-9f59-225fae4fd7de}"
"LogServer"="pmstats.org"
"LogServerPort"=dword:000001bb
"ForceIdleAcExtraTimeoutSeconds"=dword:0000012c
"ForceIdleDcExtraTimeoutSeconds"=dword:0000012c
```

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Powerman\DefaultUser]
"IdleAcTimeoutSeconds"=dword:00000708
"IdleAcAction"=dword:00000003
"IdleDcTimeoutSeconds"=dword:00000708
"IdleDcAction"=dword:00000003
"VideoTimeoutAcSeconds"=dword:00000258
"VideoTimeoutDcSeconds"=dword:00000258
"HDDTimeoutAcSeconds"=dword:00000258
"HDDTimeoutDcSeconds"=dword:00000258
```

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Powerman\NoUser]
"IdleAcTimeoutSeconds"=dword:00000258
"IdleAcAction"=dword:00000006
"IdleDcTimeoutSeconds"=dword:00000258
"IdleDcAction"=dword:00000006
"VideoTimeoutAcSeconds"=dword:00000258
"VideoTimeoutDcSeconds"=dword:00000258
"HDDTimeoutAcSeconds"=dword:00000258
"HDDTimeoutDcSeconds"=dword:00000258
```

Appendix F – Custom Actions

PowerMAN allows specific custom actions to be performed during system suspend and resume. These actions can be run for the system or per-user. Custom actions may be used to implement workarounds for undesirable application behaviour in a power management environment or to notify a third-party component that suspend/resume is occurring.

Two action types are currently supported:

1. **CLOSEWINDOW** – Close specific application window(s)
2. **RUNPROG** and **RUNHIDDEN** – Launch application / script

Custom actions are divided in to Computer and User actions. Computer actions run in the local system account. These actions cannot interact with the user's desktop. User actions configured in a run in the context of the user and may interact with the user's desktop.

CLOSEWINDOW Action

The CLOSEWINDOW action may be used to close an application or dialog prior to suspend or immediately upon resume. This is most commonly used to work around legacy applications that fail to handle suspend gracefully or fail upon resume. In most cases the CLOSEWINDOW command has the same effect as closing the window manually or pressing the Cancel button. The exact behaviour is application specific and must be determined prior to use.

Tip: Windows allows each window to be assigned some text and a window 'class'. The window text is usually the message displayed in the title bar. The 'class' is application specific and is commonly used to group similar windows together or link them to the parent application. Each application may have many windows associated with it including some that are hidden.

The CLOSEWINDOW syntax is as follows:

CLOSEWINDOW [windowtext] [windowclass]

Where either [windowtext] or [windowclass] or both may be specified or include a wildcard (*) character.

To use the CLOSEWINDOW action proceed as follows:

1. Open the target application and ensure that it is in the correct state. For the purposes of this example the target application is 'Notepad'
2. Determine the window text (and optionally class) for the window you wish to close:

```
POWERMAN LISTWINDOWS
```

3. PowerMAN will display a list of available windows. For example:

```
;HANDLE TEXT CLASS
#10424206 "Start" "Button"
#9377002 "CiceroUIWndFrame" "CiceroUIWndFrame"
#429722238 "Example - Notepad" "Notepad"
#16978356 "Start menu" "DV2ControlHost"
#25890692 "Close" "VBBubble"
#15929788 "Jump List" "DV2ControlHost"
```



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```
#7932092 "View Available Networks (Tooltip)" "VANUITooltip"
#20972380 "Task Switching" "TaskSwitcherWnd"
#19989242 "Show Results Pane" "OfficeTooltip"
#12453072 "Battery Meter" "SystemTray_Main"
```

4. Use the following command to close the specific window called 'Example – Notepad':

```
POWERMAN CLOSEWINDOW "Example - Notepad"
```

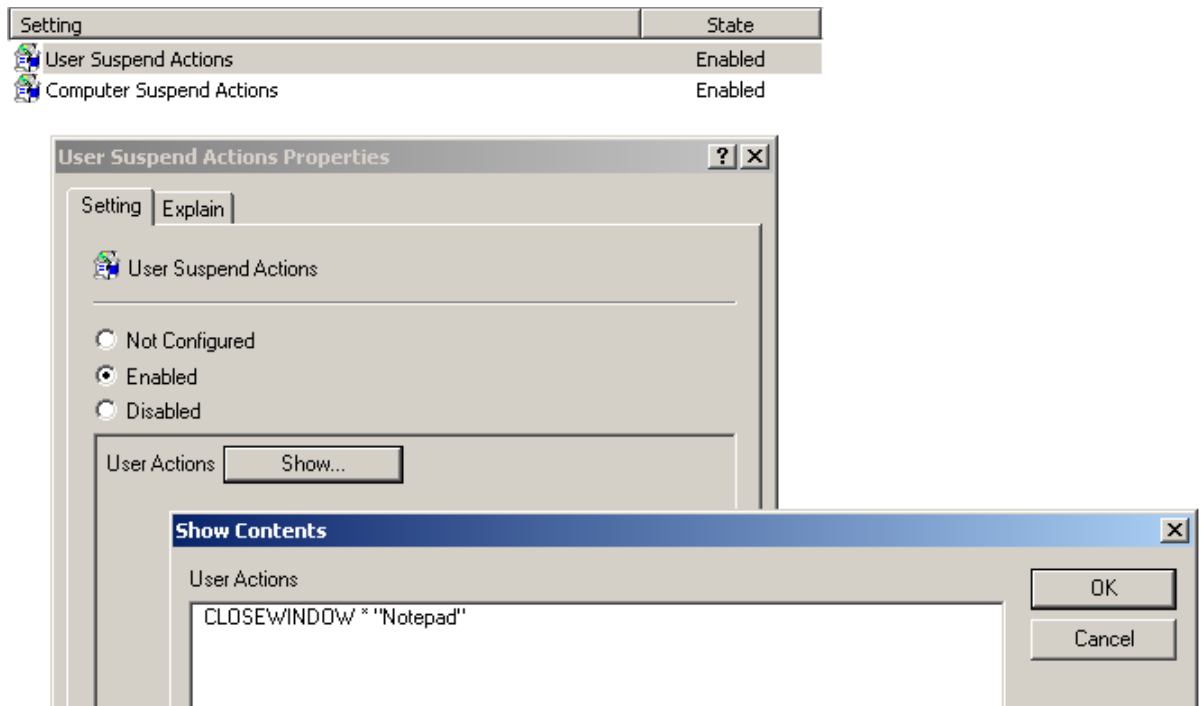
5. Use the following command to close all windows with the word 'notepad' in the title:

```
POWERMAN CLOSEWINDOW "*Notepad*"
```

6. Similarly, use the following command to close all windows with the class 'Notepad':

```
POWERMAN CLOSEWINDOW * "Notepad"
```

7. After confirming the correct command to achieve the desired behaviour add the appropriate CLOSEWINDOW command to the desired custom action policy:



Warning: Windows Vista and later allow some applications to be marked as 'High Integrity Processes'. The security feature prevents standard applications from interacting with these applications and is designed to prevent message injection attacks. CLOSEWINDOW may not be used to interact with a high integrity process. Please see the following Microsoft documentation for further details:

<http://msdn.microsoft.com/en-us/library/bb625962.aspx>

RUNPROG and RUNHIDDEN Actions

The RUNPROG and RUNHIDDEN actions may be used to launch another program during suspend or resume. The RUNHIDDEN uses the same syntax but launches the program in an invisible state.

The action syntax is as follows:

RUNPROG program [arguments]

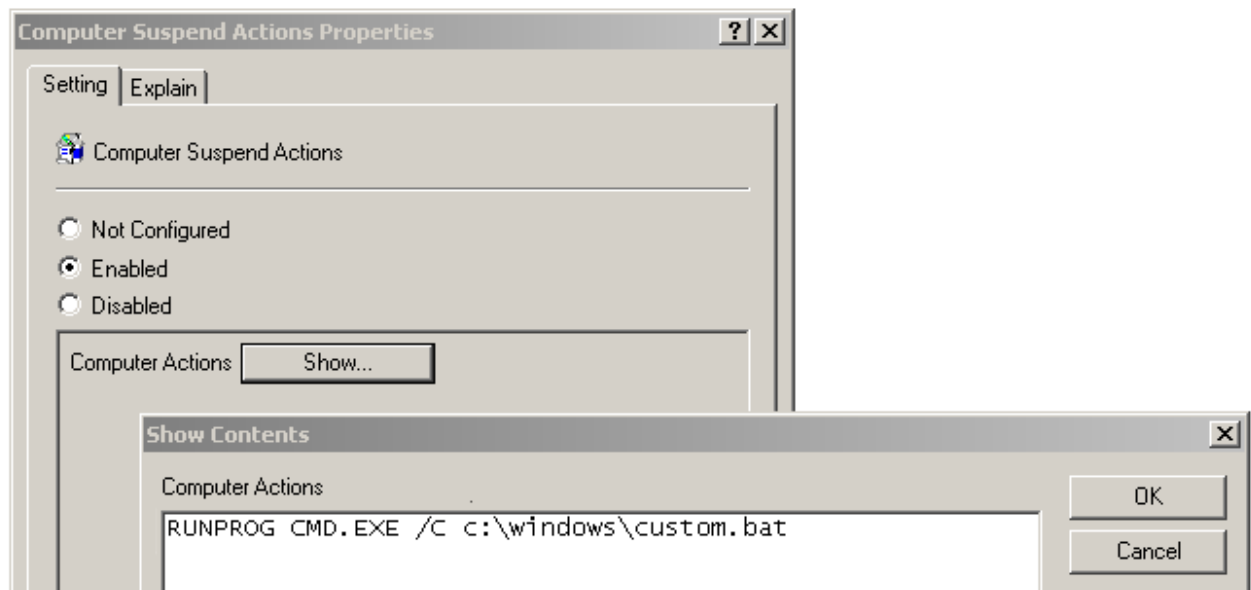
RUNHIDDEN program [arguments]

Where [arguments] may be blank.

Tip: To launch a batch file / script the program is the command interpreter CMD.EXE. For example:

```
RUNPROG CMD.EXE /C C:\WINDOWS\CUSTOM.BAT
```

| Setting | State |
|--|---------|
|  User Suspend Actions | Enabled |
|  Computer Suspend Actions | Enabled |



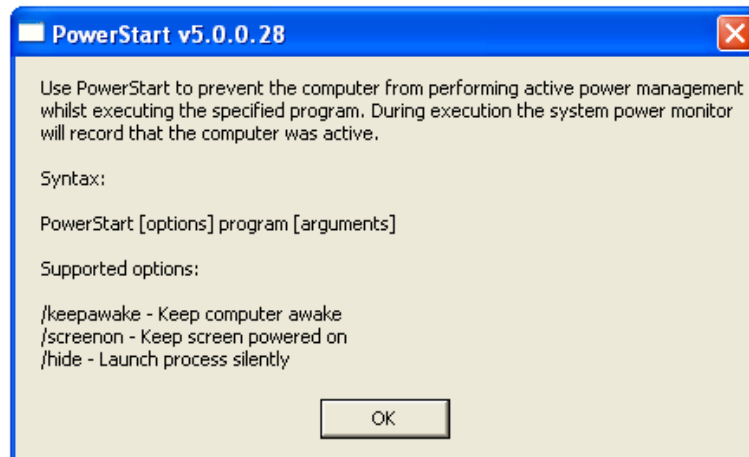
Appendix G – Inconsistent Configuration Behaviour

By default PowerMAN will try to resolve configuration problems by using the closest policy possible to that configured. This may be necessary because of inconsistent settings or missing hardware support for the chosen configuration. This feature is enabled by default. Care should be exercised when disabling this feature as it may expose problems with existing settings.

The following is a non-exhaustive list of configuration problems that may be amended by this feature:

- Mismatched global power policy or idle power policy (default, no user or specific user policy)
– The missing policy is automatically created with sensible default settings
- Policy action requires hibernate but hibernate not enabled – Hibernate is automatically enabled unless specifically disabled
- Policy action requires hibernate but hibernate not possible – Sleep mode is automatically used instead
- Scheduled resume (wake-up) policy present but wake-up timers not enabled – Wake-up timers (Windows Vista and later) automatically enabled
- Excessive video or hard disk timeout – Inconsistent timeout reduced to match idle timeout

Appendix H – PowerSTART Tool



It is sometimes desirable to ensure the computer does not sleep or hibernate whilst performing an important task. This can be difficult to ensure whilst using standard idle based power conservation and may result in active power management being sacrificed to ensure correct operation.

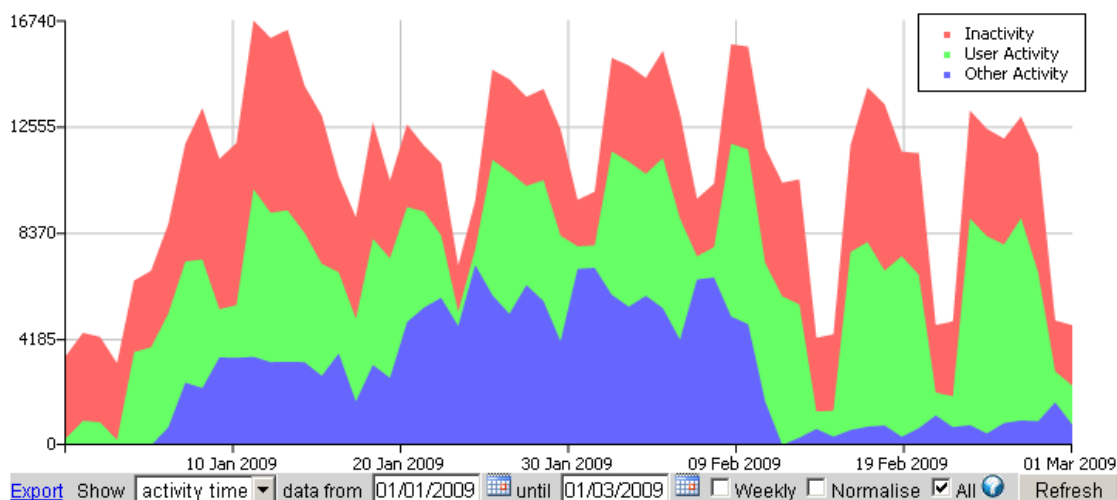
PowerMAN is supplied with a utility called PowerSTART that be used to launch a critical application. PowerSTART is included in the main PowerMAN installation when installed from the MSI file.

PowerStart can launch almost any application and whilst that program is executing will:

- Log that system was not idle (even when no user is present)
- Prevent the computer from entering the idle state

Programs launched with PowerSTART are labeled 'Other Activity' in the PowerMAN reports. This activity is shown in blue and can therefore be easily distinguished from user activity shown in green:

Activity / Hours



Appendix J – Updates for PowerMAN Enterprise Server v5.1.x

PowerMAN v5.3.x includes several new features and is fully backwards compatible with existing deployments of PowerMAN Enterprise Server (PMES). To gain full access to the new features PMES must be updated. To update your private PMES server proceed as follows:

1. Locate the folder containing the PMES website (e.g. C:\Websites\PowerMAN5)
2. Backup this folder to a safe location
3. Merge (copy and paste) the contents of the appropriate 'PowerMAN Enterprise Server Updates\PMES v5.1.0 Updates' sub-folder to your PMES website
4. Restart the PMES website

Appendix K – Common Event Log Messages

PowerMAN includes a comprehensive event logging feature. This section explains the most common logged events. The exact wording of some events may change from one PowerMAN release to another. However, the general meaning of a specific event number will always be the same. Some events include parameters such as times, program or user names. The first parameter is shown as %1. The second parameter, if present, is marked %2 and so on.

| Event | Meaning |
|-------|---|
| 1000 | PowerMAN Power Management service installed. |
| 1001 | PowerMAN Power Management service uninstalled. |
| 1002 | PowerMAN Power Management service running. |
| 1003 | PowerMAN Power Management service stopped. |
| 1009 | <p>The Terminal Services service (TermService) failed to start within a reasonable time. This service is required by the PowerMAN Power Management service.</p> <p>The Windows Terminal Services Service did not start. PowerMAN requires this service to function on Windows XP. Please check that this service is set to either manual or automatic start (manual is the default).</p> |
| 1013 | <p>Additional debug power information will be reported. This is an intensive process and should only be used when absolutely necessary</p> <p>PowerMAN's debugging features are enabled. This will result in a much greater amount of information being logged in the event log. Sometimes a debug text file is also created. This option should not be enabled in a production environment for longer than necessary.</p> |
| 1016 | <p>No valid product key was found. Check product key and registered organisation name.</p> <p>The product key was missing or invalid. Please check it. The POWERMAN LICENSE command will report additional information.</p> |
| 1019 | <p>Product key has expired. Please contact your sales representative to obtain an updated product key. The software will continue to function in reduced functionality mode.</p> <p>Some types of product key are designed to expire after a certain time. Please obtain an updated product key.</p> |
| 2000 | System entering sleep/hibernate state |
| 2001 | System resumed |
| 2002 | System entering shutdown |
| 2003 | <p>The computer is being prevented from entering the idle state by an unknown program. This is NOT a program configured by the Administrator. This may result in increased energy consumption</p> <p>Another program, not part of the PowerMAN suite, is preventing the computer from entering a lower power state. Please consider using the policy enforcement feature or other debugging steps to determine the specific program that is causing the problem.</p> |
| 2004 | A program has indicated that it is performing activity and the computer is being prevented from entering the idle state. This may result in increased energy consumption. |
| 2005 | The computer is being prevented from entering the idle state because the Server Service is running. This may result in increased energy consumption |
| 2006 | The computer is being prevented from entering the idle state due to a protected |

| Event | Meaning |
|-------|--|
| | program or file specified by the Administrator. This may result in increased energy consumption |
| 2010 | PowerMAN is preventing the computer from entering the idle state because it has recently automatically resumed. |
| 4000 | Removed invalid power policy for user Sometimes power polices can become inconsistent. This often happens when roaming profiles are used and the power policy in the roaming profile has no counterpart on the computer. PowerMAN removes such policies before creating a new one. |
| 4003 | Power policy for user checked and does not need to be updated The existing power settings match those configured by the administrator. No action is necessary. |
| 4009 | Automatic wake enabled for %1. The auto-wake operation may fail if not supported by hardware or if the system is shutdown. Most systems do not support wake from power off (S5) state. |
| 4013 | Scheduled shutdown/sleep policy enabled for %1 |
| 4016 | The next power policy update is scheduled for around %1 |
| 4019 | Scheduled sleep event. This system will suspend |
| 4020 | Scheduled hibernate event. The system will hibernate |
| 4021 | Scheduled shutdown event. The system will shutdown |
| 4023 | Scheduled wake event. The system is now active |
| 4024 | An invalid global power policy was found. The policy settings were %1 |
| 4025 | An invalid power policy was found. The policy settings were %1 |
| 4026 | A global power policy was found. The policy settings are %1 |
| 4027 | A power policy was found. The policy settings are %1 |
| 4031 | Due to recent activity rescheduled next power policy update for around %1 PowerMAN detected a change that requires the power policy to be checked / updated. The update is postponed for a few seconds to allow the system to stabilise. |
| 4042 | The power policy has been repeatedly applied %1 times. This may indicate that another program (or user) is changing the policy settings. It may also indicate a problem with the policy settings. If this continues please contact Technical Support Occasionally other programs may interfere with PowerMAN. This event warns that PowerMAN has repeatedly configured the chosen power settings because some other process is also changing them. If this event happens frequently you will need to investigate the cause of the problem. |
| 4047 | Enforced sleep event. This system will suspend. Last activity %1. Active timeout was %2 seconds The policy enforcement feature forced the computer to sleep. This happened because some other process was inhibiting the normal Windows idle timer. |
| 4048 | Enforced hibernate event. The system will hibernate. Last activity %1. Active timeout was %2 seconds The policy enforcement feature forced the computer to hibernate. This happened because some other process was inhibiting the normal Windows idle timer. |
| 4049 | Enforced shutdown event. The system will shutdown. Last activity %1. Active timeout was %2 seconds The policy enforcement feature forced the computer to power-off. This happened because |

| Event | Meaning |
|-------|---|
| | some other process was inhibiting the normal Windows idle timer. |
| 4051 | User has been inactive for over %1s and will be logged out |
| 4052 | Scheduled shutdown/sleep event inhibited by protected service, program or file |
| 4053 | Scheduled shutdown/sleep event inhibited by an application or service that has requested the system remain active |
| 4061 | The system has automatically resumed and will be prevented from returning to previous power state for %1 |
| 4062 | The system has automatically resumed but may return to the previous state shortly unless user activity prevents this. To avoid the system entering automatically re-entering a low-power state please consult product documentation |
| 6009 | Discarded some stale events. These are too old to be reported PowerMAN abandoned some historic power logs because they were older than the configured timeout. This usually happens if the PC has been turned off for an extended period. Although this does result in some loss of log continuity it is rarely a problem. |
| 6013 | Failed to upload XML (Error %1): %2 There was a problem transferring the power log data to the PowerMAN reporting server. The error number is normally a Windows Winsock error code indicating the cause of the problem. See http://msdn.microsoft.com/en-us/library/ms740668(VS.85).aspx for an explanation of these codes. |
| 6015 | Downloaded XML was corrupt: %1 The response from the PowerMAN server was incomplete. This may indicate a network or proxy server problem. |
| 6016 | Report operation fully completed. All data sent to server. |
| 6017 | Report uploads are disabled. Both a logging server and site identity are required. This can also be caused by a failure to correctly determine the computer identity |
| 6020 | No SiteGUID value configured. The computer is not a member of a reporting site. This will prevent power usage information being uploaded. To enable reporting features check the SiteGUID setting |