Wired for Management Baseline Testing

Intel Test Revision 1.1a-1

A Baseline Test Plan for Wired for Management Version 1.1a Client Systems

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Intel Corporation

CONTENTS

Section

1

Introduction

Wired for Management Baseline Testing

This document describes a set of tests for Network PC and Managed PC platforms that support the features described in the Wired for Management (WfM) Baseline specification. Testing for Wired for Management Baseline specifications, as used in this document, means that the management features required by the Wired for Management Version 1.1a Baseline are present, functional, and meet the requirements of this test specification and that the additional interoperability tests described in this document have been successfully passed. Successful completion of these tests is not a guarantee of present or future functionality or performance.

Baseline Test Approach

Baseline testing comprises compliance tests and interoperability tests conducted in a real-world network environment. Successful completion of the compliance test phase is a prerequisite to entering the interoperability test phase.

The compliance test phase is focused on testing for the presence and functionality of the features required by the Wired for Management 1.1a specification. Testing will not check for quality, or for completeness of any underlying software or support structures. Individual tests, described in this document, will be executed to check for each of the WfM features.

The interoperability test phase is focused on testing the client against several pre-defined manageability test scenarios. These manageability scenarios exercise WfM features in a simulation of real-world situations. Further, these test scenarios are executed while the client platform is in several different locations within the interoperability test network.

The tests contained in this document represent the Wired for Management tests selected at the time of publication. As new test capabilities become available, they will be included in subsequent versions of this Baseline Test document.

Revision History

This document will be revised as new test capabilities and tools become available. Additionally, this document will evolve to meet the requirements of new Wired for Management versions as they are released.

Date	Author	Revision
9/8/97	Stan Booher	1st Draft

Related Documents

- **Wired for Management Baseline Version 1.1a (http://www.intel.com/managedpc)**

- **DMTF Desktop Management Interface Specification Version 2.00 (http://www.dmtf.org/tech/specs.html)**

Section

2

Wired for Management Overview

Wired for Management Initiative

Wired for Management (WfM) is an Intel initiative to improve the manageability of desktop, mobile, and server systems. The goal of WfM is to reduce the Total Cost of Ownership (TCO) through improved manageability. The Wired for Management Baseline addresses improved manageability in four technology areas:

- Remote New System Setup

- Remote Wake-Up

- Instrumentation

- Power Management

Manageability features in each of these four technology areas combine to form the Wired for Management Baseline specification.

Remote New System Setup

The WfM Baseline requires that platforms implement a Preboot Execution Environment (PXE) that specifies the protocols by which a client requests and downloads an executable image from a server, and the minimum requirements on the client execution environment when the downloaded image is executed. It does not specify the implementation details of preboot code on the client nor the provisions for security (authorization, privacy, and data integrity) during the exchanges between the client and the server. The conditions under which the PC initiates remote OS installation are implementation-dependent. PXE is specified in Appendices of the WfM 1.1a Baseline.

Remote Wake-Up

To minimize the downtime end-users experience for system maintenance and upgrades, a Manageable PC must provide the ability to be automatically managed during off-hours, when the system is not otherwise in use. Remote wake-up lowers TCO by increasing availability for end-users and minimizing time for system maintenance (which, in turn, reduces system failures and downtime).

The Wired for Management Baseline specifies that it must be possible to remotely wake-up a Managed PC from a soft-off state.

Instrumentation

The Wired for Management Baseline requires that compliant platforms use the DMI v2.00 Management Interface (MI) and Component Interface (CI) application programming interfaces and host a DMI v2.00 Service Provider, as defined by the Desktop Management Task Force (DMTF). The Baseline Instrumentation specification also identifies specific DMI Standard Groups, including event generation groups, that must be instrumented by a Baseline-compliant platform. In addition, it describes the deployment model for the Service Provider and instrumentation.

The Baseline Instrumentation specification does not define how instrumentation is implemented beneath the required application programming interfaces, nor what sources or methods are used to extract management information from the platform. The Baseline also does not prohibit vendors of platforms or platform components from extending the manageability of the platform by instrumenting additional DMI standard or proprietary groups, or by extending the management framework beyond DMI.

Power Management

WfM Baseline systems should support Working and Soft Off states. Soft off is usually provided by a user-accessible switch that send a soft-off request to the system. What the system does with the soft-off request to transition states is application-dependent. In the Working state, user mode application threads are dispatched and running.

Section

3

Wired for Management Baseline Compliance Tests

Compliance Test Network

Network Hardware Requirements

The WfM Baseline Compliance Test Network, shown in Fig 1.0, consists of the following;

- 10Mb hubs and routers configured to establish three separate sub-networks.

- A server located in Sub-network 1 to provide PXE test services.

- A server located in Sub-network 2 to provide DHCP services.

- A test tools PC located in Sub-network 3 to host DMI test tools and Remote Wake-Up test tools.

- Some tests require the presence of other Network or Managed PC clients. The network placement of these PCs are specified by the individual test cases. These Reference PCs consists of Intel Network PCs or any other Network PCs that have previously passed the tests contained in this document.
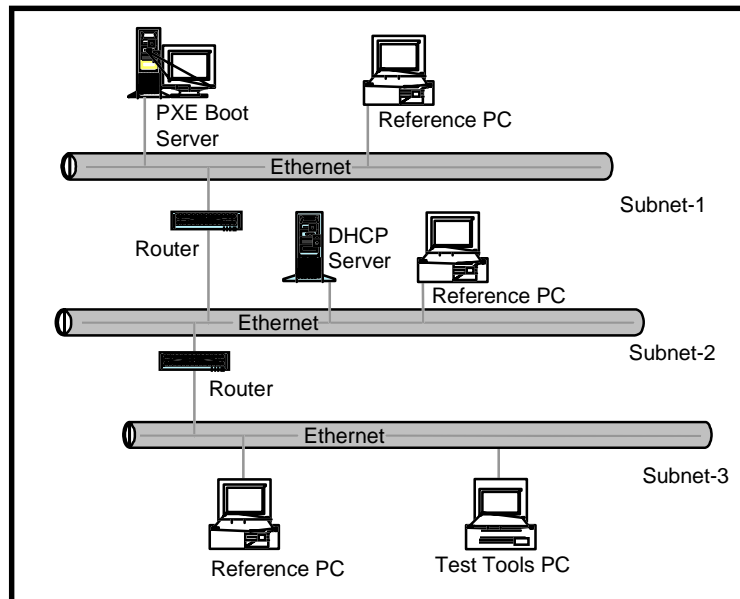

Fig. 1.0 WfM Baseline Test Network

Network Software Requirements

Test environment software consists of the following operating systems and applications:

- **PXE Boot Server software:** Microsoft NT* 4.0 Server operating system with the latest version of the PXE PDK test tools installed.

- **DHCP Server software:** NT 4.0 Server operating system with DHCP services enabled and configured to supply IP addresses in each of the three sub-networks.

- **Test Tools PC:** NT 4.0 Workstation operating system, the DMI 2.0 MIF Conformance test tool (compchk.exe), and any LAN analyzer software that is capable of capturing and re-transmitting a captured LAN packet.

Wired for Management Baseline Compliance Test Descriptions

The compliance test phase is focused on testing for the presence and functionality of the features required by the Wired for Management 1.1a Baseline specification. Testing will not check for quality or for completeness of any underlying software or support structures. Individual tests, described in this document, will be executed to check for each of the WfM features. Tests will be conducted using available operating systems, product development kits, and test tools.

Remote New System Set-Up Test Descriptions

DHCP and Proxy Tests

The following tests exercise proper distribution and receipt of leased IP addresses and the correct handling of multiple DHCP offers. DHCP offers from the DHCP server include a valid IP address, while offers from the PXE Server include a null IP address. Execution of some of these test cases requires several other Network or Managed PC clients to be present on the network, one of which must be the client System Under Test (SUT).

Case ID	Test Case	Expected Result
DHCP.100	Place the SUT on Subnet 3. Initiate a power-on boot of the SUT.	The SUT requests and receives an IP address from the DHCP server. The SUT connects to the network and receives the PXE server menu.
DHCP.101	Ensure that the DHCP server contains an IP scope of three addresses for Subnet 3. Place the SUT and three support clients on Subnet 3. Perform a power-on boot on all clients (SUT last).	DHCP issues a valid IP address to only three clients. The SUT (since it's the last client to request an address) does not receive an IP address and does not connect to the PXE server.

TFTP Tests (with optional tests and results for MTFTP implementations)

The TFTP test cases exercise client request and download of files from the PXE server. Execution of some of these test cases requires several other Network or Managed PC clients to be present on the network, one of which will be the client System Under Test (SUT). MTFTP is an optional feature that should be tested in PXE implementations that support its use. Expected results for PXE implementations that support MTFTP are marked with an asterisk (*). Case ID MTFTP 104 is executed only on PXE implementations that support MTFTP.

Case ID	Test Case	Expected Result
TFTP.100	Place two clients and the SUT on Subnet 1. Perform a power-on boot on all platforms at the same time.	All clients, including the SUT, successfully receive a DHCP address, connect to the PXE server and download the PXE test menu. *MTFTP-enabled clients SHOULD use MTFTP for all image downloads.
TFTP.101	Place two clients on Subnet 1. Place one client and the SUT on Subnet 2. Perform a power-on boot on all platforms at the same time.	All clients, including the SUT, successfully receive a DHCP address, connect to the PXE server and download the PXE test menu. *MTFTP enabled clients SHOULD use MTFTP for all image downloads.
**MTFTP.104	Disable MTFTP on the PXE server. Place two clients and the SUT on Subnet 1. Perform a power-on boot on all platforms at the same time.	All clients, including the SUT, successfully receive a DHCP address, connect to the PXE server and download the PXE test menu. *MTFTP Clients SHOULD attempt to use MTFTP then back off to TFTP when MTFTP fails.

* These results are for PXEs that implement MTFTP.
**This entire test is optional.

PXE API Tests

PXE includes a number of APIs which are available to downloaded NBPs (Network Boot Programs). These APIs allow implementation of universal NBPs that do not have to understand the hardware particulars of the underlying Network Interface. PXEtest.exe has been created to test for the presence and conformance of these calls. In the event of a failure, the test returns an error describing the failure and at which API the failure took place.

The PXE API test (PXEtest.exe) is installed as a service on the PXE Boot Server. On bootup of the System Under Test (SUT), the PXE test is selected and executed. The results from the API test is reviewed, and failures noted.

Case ID	Test Case	Expected Result
API.100	Place the SUT on Subnet 1. Perform a power-on boot on the SUT and perform the selections necessary to load and run the PXE UNDI API test.	The SUT successfully receives a DHCP address, connects to the PXE Boot Server and downloads the PXE test menu. The SUT completes the API UNDI test and writes results to a file on the virtual a: drive. Review the file to ensure no errors were encountered.

Remote Wake-Up

These tests validate the client Remote Wake-Up support. The tests cover two conditions: valid wake-up packet and wake-up packet with a single bit error.

Case ID	Test Case	Expected Result
RWU.100	Locate the SUT on Subnet 3. Place the SUT in a soft-off state. Send the SUT a properly formatted wake-up packet from the Test Tools PC. Have a LAN analyzer set up to capture the transmitted wake-up packets.	The client recognizes the wake-up packet and transitions to the working state.
RWU.101	Locate the SUT on Subnet 3. Place the SUT in a soft-off state. Edit the captured wake-up packet from RWU.100 using the LAN analyzer, and introduce a single bit error in the MAC address portion of the wake-up packet payload. Send the SUT the edited wake-up packet.	The client remains in the soft-off state.

Instrumentation

Instrumentation is tested via the DMI Compchk test tool (compchk.exe) running on a networked PC platform. Compchk.exe provides the capability of connecting to the SUT (via RPC) and checking the contents of the SUTs Management Information Format (MIF) database. The test implements a two-pass approach to testing the SUTs MIF database. In the first pass, the SUTs MIF entries are checked to ensure they meet DMI 2.0 format requirements. The second pass checks for the presence of the Wired for Management-required MIF entries. Test results are displayed in the Compchk window where they can be reviewed or saved to a disk file.

Case ID	Test Case	Expected Result
INS.100	Place the SUT on Subnet 3. Using the Compchk tool, connect to the client using RPC.	RPC connection completes successfully, indicating the presence of a DMI 2.0 Service Provider. The SUTs MIFs are visible in the Compchk window.
INS.101	Select the Master MIF file for the DMI 2.0 format portion of the test, and the WfM file for the required portion of the test. Execute the Compchk test.	The first part of the test verifies that the SUTs MIFs are properly formatted. Incorrectly formatted MIFs are noted in the Compchk results. The second part of the test verifies the presence of the WfM-required groups. Absence of any of the WfM-required groups are noted in the Compchk results.

Power Management

Power management feature support is tested by exercising transitions between the working and soft-off states. The power management transition from soft-off to working via receipt of a wake-up packet is tested in RWU.100.

Case ID	Test Case	Expected Result
POW.100	From the working state, execute a shutdown of the SUT. Press the soft on/off switch to initiate a boot.	SUT transitions from soft-off state to working state. SUT boots to the installed OS.

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Section

4

Wired for Management Baseline Interoperability Tests

Interoperability Test Network

Network Hardware Requirements

The WfM Baseline Interoperability Test Network is shown in Figure 2.0. The Interoperability Test Network consists of the following components:

- 10Mb hubs and routers configured to establish three separate sub-networks.

- A Management Server capable of supplying management services that take advantage of the capabilities of a Wired for Management-enabled client.

- A server located in Sub-network 2 to provide DHCP services.

- A file server located in Sub-network 3 to provide alternate storage of operating systems and applications.

- A test tools PC located in Sub-network 3 to host DMI test tools and Remote Wake-Up test tools.

- Some tests require the presence of other Network or Managed PC clients. The network placement of these Reference PCs are specified by the individual test cases. For this revision of the Wired for Management Baseline Test Program, the Reference Network PC clients consists of Intel Network PCs.
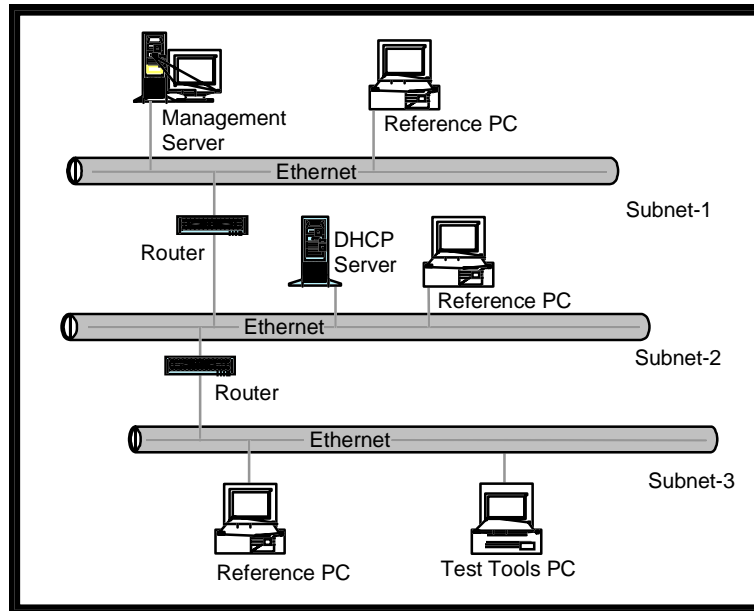
Fig. 2.0 WfM Baseline Interoperability Network

Network Software Requirements

Test environment software for the Interoperability Network consists of the following operating systems and applications:

- **Management Server:** For this release of the Wired for Management Baseline Test Program, management services will be provided by a LANDesk Configuration Manager v1.5. The LCM 1.5 will be used to supply: new system set-up; remote instrumentation viewing; remote wake-up; and software distribution services.

- **DHCP Server software:** NT 4.0 Server operating system with DHCP services enabled and configured to supply IP addresses in each of the three sub-networks.

- **File server:** Novell NetWare* v4.x Server

- **Test Tools PC:** NT 4.0 Workstation operating system, the DMI 2.0 MIF Conformance test tool (compchk.exe), and any LAN analyzer software capable of capturing and re-transmitting a captured LAN packet.

Test Network Configurations

The Interoperability Test Network will not be altered during the execution of any of the Interoperability Tests. The client System Under Test (SUT) may be moved to different subnet locations as required by individual tests.

WfM Interoperability Test Descriptions

The interoperability test phase is focused on testing the client against several pre-defined manageability test scenarios. These manageability scenarios exercise WfM features in a simulation of real-world situations. Further, these test scenarios are executed while the client platform is in several different locations within the interoperability test network.

Interoperability Test #1

Interoperability Test #1 verifies New System Set-Up (Pull Technology) of Microsoft Windows 95 OS. Execution of this test requires the establishment of a management service that performs the following:

- Fat 16 format

- OS: Install Microsoft Windows 95

- Application: Install Microsoft Office97*

- Agent: Install Software Distribution

- Network: Map a network connection to Management Server on Subnet 1

- Network: Map a network connection to File Server on Subnet 3

Once the management service described above is established, Interoperability Test #1, Manageability Scenarios, may be executed.

Manageability Scenario 1-A

Description

Place the SUT on Subnet 1; initiate New System Set-Up by pressing the soft-off button on the SUT. Verify installation of Windows 95 and Microsoft Office97. Verify installation of Software Distribution agent by executing remote control feature on the SUT. Verify correct network mappings.

Expected Results

New System setup proceeds to completion, with all features present and functional on the SUT.

Manageability Scenario 1-B

Description

Repeat Manageability Test Scenario 1-A with the SUT on Subnet 2. Repeat Manageability Test Scenario 1-A with the SUT on Subnet 3.

Expected Results

The same as Manageability Test Scenario 1-A.

Manageability Scenario 1-C

Description

Place an Intel Network PC on Subnet 1 and Subnet 2. Place the SUT on Subnet 3. Perform Manageability Test Scenario 1-A on all network PCs at the same time. Verify correct installation on the SUT.

Expected Results

The same as Manageability Test Scenario 1-A.

Interoperability Test #2

Interoperability Test #2 builds on the New System Set-Up established in Interoperability Test #1. Interoperability Test #2 requires that a software distribution package for Visio* v4.0 be available for delivery by the Management Server.

Manageability Scenario 2-A

Description

Place the SUT in Subnet 1. Ensure SUT contains New System Set-Up as described in Manageability Test Scenario 1-A.. Perform a shutdown on the SUT and press the user switch to place the SUT in Soft-Off state. Initiate a remote Wake-Up and software distribution of Visio from the Management Server.

Expected Results

The SUT recognizes the remote wake-up packet and transitions from Soft-Off to Working state. Once booted, the Visio application is successfully installed.

Manageability Scenario 2-B

Description

Place the SUT in Subnet 2 and repeat the test as described in Manageability Scenario 2-A. Place the SUT in Subnet 3 and repeat the test as described in Manageability Scenario 2-A.

Expected Results

The same as Manageability Scenario 2-A.

Interoperability Test #3

Interoperability Test #3 verifies New System Set-Up (Pull Technology) of Windows NT v4.0 OS. Execution of this test requires the establishment of a management service that performs the following:

- Fat 16 format

- OS: Install Microsoft Windows NT v4.0 Workstation

- Application: Install Microsoft Office97

- Agent: Install Software Distribution

- Network: Map a network connection to the Management Server on Subnet 1

- Network: Map a network connection to the File Server on Subnet 3

Once the management service described above is established, Interoperability Test #3 Manageability Scenarios may be executed.

Manageability Scenario 3-A

Description

Place the SUT on Subnet 1; initiate New System Set-Up by pressing the soft-off button on the SUT. Verify installation of Windows NT v4.0 and Microsoft Office97. Verify installation of Software Distribution agent by executing remote control feature on the SUT. Verify correct network mappings.

Expected Results

New System setup proceeds to completion, with all features present and functional on the SUT.

Manageability Scenario 3-B

Description

Repeat Manageability Test Scenario 3-A with the SUT on Subnet 2. Repeat Manageability Test Scenario 3-A with the SUT on Subnet 3.

Expected Results

The same as Manageability Test Scenario 3-A.

Manageability Scenario 3-C

Description

Place an Intel Network PC on Subnet 1 and Subnet 2. Place the SUT on Subnet 3. Perform Manageability Test Scenario 3-A on all network PCs at the same time. Verify correct installation on the SUT.

Expected Results

The same as Manageability Test Scenario 3-A.

Interoperability Test #4

Interoperability Test #4 builds on the New System Set-Up established in Interoperability Test #3. Interoperability Test #4 requires that a software distribution package for Visio v4.0 be available for delivery by the Management Server.

Manageability Scenario 4-A

Description

Place the SUT in Subnet 1. Ensure the SUT contains New System Set-Up as described in Manageability Test Scenario 3-A. Perform a shutdown on the SUT and press the user switch to place the SUT in Soft-Off state. Initiate a remote Wake-Up and software distribution of Visio from the Management Server.

Expected Results

The SUT recognizes the remote wake-up packet and transitions from Soft-Off to Working state. Once booted, the Visio application is successfully installed.

Manageability Scenario 4-B

Description

Place the SUT in Subnet 2 and repeat the test as described in Manageability Scenario 4-A. Place the SUT in Subnet 3 and repeat the test as described in Manageability Scenario 4-A.

Expected Results

The same as Manageability Scenario 4-A..

Section

5

Wired for Management Baseline Test Evolution

Future Revisions of This Document

This document will be revised to meet the Baseline Testing Program needs associated with new versions of the Wired for Management Baseline specification and the release of new test tools that provide increased feature coverage and capabilities.

The revision of this document (visible on the cover page) will utilize the following format:

- Intel Test Revision <Wired for Management revision number> - <Baseline Test revision number>

The Wired for Management revision number will indicate the WfM version used as a basis for generation of the tests contained in the Baseline Test document, while the Baseline Test revision number will indicate the evolution of methods utilized to accomplish the tests.