



TruManage™ Technology

Remote Management and Control of Client PCs

TECHNICAL BRIEF

INTRODUCTION

A reliable and secure IT infrastructure is essential for every business. This challenge is multifaceted as organizations contend with leaner budgets, limited resources, and increased network complexity. The ability to reduce the cost of maintaining computers around the globe, and in a distributed environment, is becoming a necessity. Various management solutions that address these IT needs are available. However, many of them are system-vendor dependent and require a workable operating system and/or consume significant levels of energy to ensure managed PCs are accessible at all times. These solutions are also proprietary and unique, and include costly IT support customization for each enterprise. This results in an increased total cost of ownership (TCO) and a lack of efficiency and consistency when managing these PC systems.

Background

Over the last decade, remote PC management has matured to offer a set of resources that facilitate IT tasks by minimizing manual labor and lowering TCO.

Such capabilities enable basic remote manageability of personal computers (such as hardware/software inventory, alerting, software installation and updates, and so forth), but are limited to working within the operating system. These tools also lack the robust security requirements that are needed in enterprise environments.

IT infrastructure design, stability, and remote management and control, now require an elevated level of system flexibility to fulfill these increasingly demanding responsibilities.

This technical brief highlights Broadcom® TruManage technology and specifies how it addresses prevalent IT community concerns. This technology enables remote and secure manageability regardless of the system or operating system state, while maintaining high energy efficiency and government agency compliance.



TruManage Technology Benefits

- Eliminates desk-side visits
- Lowers TCO
- Optimizes PC deployment
- Scalable architecture
- Enables efficient platform provisioning
- Mainstreams manageability tools

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TruManage Technology Fundamentals

Broadcom's TruManage technology is built on a scalable Gigabit Ethernet (GbE) controller architecture that combines highly optimized hardware, firmware and software to enable extremely low-power and cost effective management functionality for in-band, out-of-band and out-of-service environments.

The figure to the right illustrates the incorporation of TruManage technology into the Broadcom NetXtreme® GbE NIC management engine, and how it is typically implemented in a PC platform.

GbE controllers with TruManage technology integrate an on-chip applications processor and system memory to provide a single-chip solution for network connectivity and platform manageability at all times, enabling the proliferation of advanced client manageability throughout the enterprise.

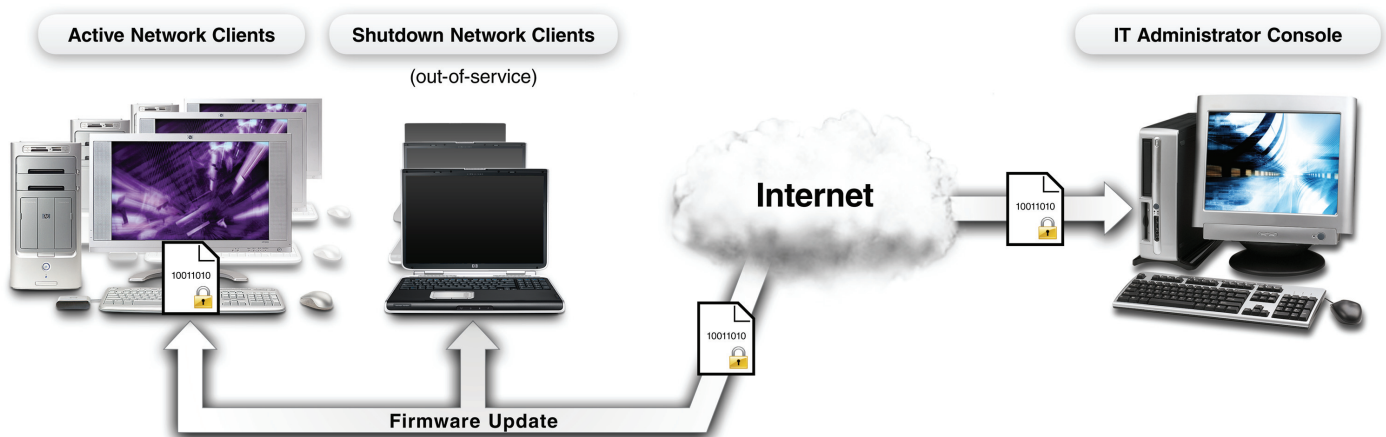
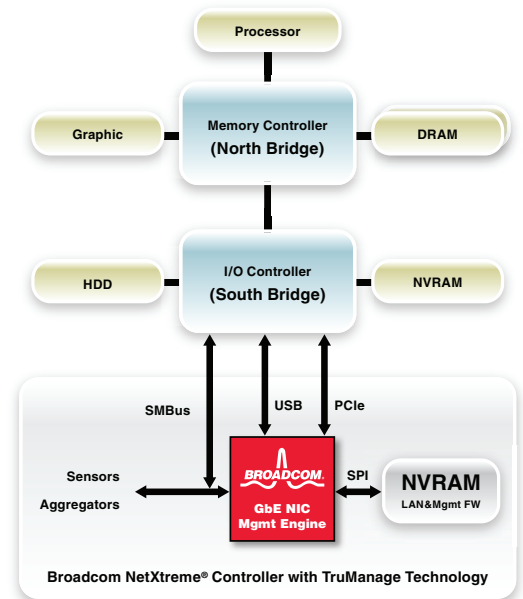
Practical Application

Broadcom's centralized architecture enables a secure and reliable solution that is less susceptible to system component failures. When the AC power cable is plugged-in (and without requiring any boot), a remote IT console can start

managing the platform regardless of its state. Network connectivity, along with manageability protocols, are available without the system's operating system support. When TruManage technology is enabled, all firmware and software stacks run exclusively on the controller (for example, Real-Time-Operating-System, network stack, WS-Man stack including HTTP/HTTPS protocol stacks) and without the need to share any of the system components, such as system memory, chipset or processor, which increases reliability and maximizes availability.

Contrary to Broadcom's centralized solution, some proprietary client manageability methodologies rely on system memory (management firmware operates on system memory) and a continuous power source to support platform components. This is true even when the system is in a sleep state. As a result, competing client manageability solutions are less reliable and less power efficient, resulting in an increased TCO for IT.

The figure below illustrates the advantage of using TruManage technology to push out a firmware update (or other asset management request) from an IT administrator console to both an active and an out-of-service network client.



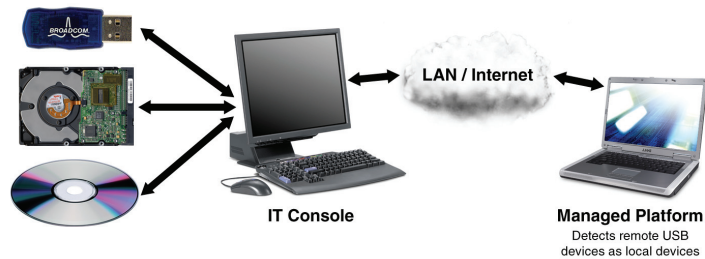
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TruManage Technology Highlights

- Asset Management:** TruManage technology enables basic platform management features to ensure efficient system operation and comprehensive asset tracking of hardware and software inventory. Advanced logging and indications/reporting provides an easy and effective mechanism for IT managers to control inventories and be alerted to any change in system components.
- Power Control:** PC systems with TruManage technology can be powered up/down or reset securely from a remote console or web browser. IT administrators can decide to do 'graceful' or 'ungraceful' power control to eliminate any impact on the user and take advantage of down-time to perform manageability functions transparently.
- User Account Management:** To efficiently and securely manage distinct platform tasks assigned to various IT personnel, TruManage technology enables assigned IT managers to be associated with different roles. Each role can be configured to perform different functions. Supported roles can be dynamically and remotely created, resulting in full account management such as account creation/deletion, password modification, and so forth.
- Text Console Redirection:** If the IT administrator needs to check or change the BIOS setting on a remote system, the text console redirection feature allows the BIOS menu screen (or any text console) to be redirected to the IT administrator's console. With the local import ports being locked, the administrator can reconfigure and reboot the system remotely.
- USB Redirection:** When a system's hard drive crashes and no operating system is available, an IT administrator can take advantage of the USB-redirection feature to either map a remote drive as a USB device, or use a standard USB-storage device on the remote console, to make it appear as if it were plugged locally at the managed system.



This feature enables remote boot, provisioning, re-imaging and diagnostics while leveraging the existing USB plug-n-play capabilities, as shown in the figure above. This eliminates desk-side visits and extends the IT manager's accessibility to remote platforms.

TruManage Technology Value Added Benefits

Standards-Based: Globally managing PC systems, in multi-vendor, distributed enterprise environments, creates a critical challenge for today's IT administrators as they are required to manage a disparate set of tools and applications. The tools are mainly proprietary, and must be adapted specifically to each individual corporate enterprise, resulting in an increased TCO and a lack of efficiency and consistency when managing these PC systems.



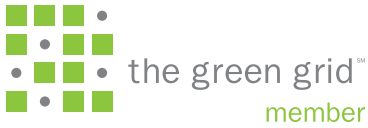
Open-standard technology offers increased choice, reduced cost for training and deployment, and improved interoperability in a heterogeneous IT management infrastructure. Broadcom TruManage technology is built on Distributed Management Task Force (DMTF) standards and protocols, and supports Alert Standard Format (ASF), Desktop and Mobile Architecture for System Hardware (DASH) and Platform Management Component Intercommunications (PMCI).

IT consoles that support DMTF standards can manage any platform with TruManage technology, regardless of the chipset/processor or OEM vendor.

With this flexibility, IT managers won't have to worry about what tools to use to manage which platform, or what state the platform is in (sleep or functional). Broadcom is a board member and significant contributor to the DMTF organization.

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Power Efficient: The ability to fully diagnose and repair systems remotely (bare-metal or with a crashed OS) should not be at the expense of increased power consumption. By integrating platform manageability on the LAN controller, Broadcom enables full capability for both network connectivity and platform manageability while drawing minimal power. With TruManage technology, a green PC can still be fully managed and compliant with EnergyStar™

and other government agencies in the United States, Europe and globally. The networking subsystem consumes less than 0.2W when the system is in a sleep state -- even while being managed remotely -- resulting in a total system power consumption that is below 1W from the wall. Broadcom is a participating member in the Green Grid industry consortium.

Easy-Access Web Interface: In small business environments, where a full IT console tool is cost and resource prohibitive, TruManage technology offers the ability to manage any platform on the network using any web browser. A web server runs on the controller hardware and provides a full set of capabilities (power control, asset management, user account management, and so forth) to securely manage, diagnose and repair systems remotely. This enables direct communication with the remote PC, regardless of its state.

TruManage Technology Feature Set

The TruManage technology feature set is used in the BCM5761 and BCM5761E controller products.

Manageability Features	TruManage v1.0	TruManage v1.1
Alert Standard Format (ASF 2.0)	•	•
Desktop and Mobile Architecture for System Hardware (DASH 1.1)	•	•
Platform Management Component Intercommunication (PMCI)	•	•
Remote management via a web-interface	•	•
System inventory and control	•	•
User account management	•	•
BIOS management	•	•
Offline mailboxes/Opaque management data	•	•
Indication	•	•
In-band firmware update	•	•
In-band NIC management	•	•
In-band management: Ethernet port and SW inventory	•	•
Out-of-Band IPv6 capabilities	•	•
Text console redirection	•	•
In-band user account management		•
Certificate authority integration		•
USB redirection		•
Remote power control with graceful shutdown		•
Zero touch provisioning		•
Out-of-band firmware update		•

BROADCOM CORPORATION

5300 California Avenue
Irvine, California 92617
Phone: 949-926-5000
Fax: 949-926-5203
E-mail: info@broadcom.com

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Conclusion

Small and large enterprise IT managers are continuously under pressure to increase the efficiency and reliability of their infrastructure while maintaining lower cost of ownership. Therefore, the ability to manage platforms remotely without sending on-site support personnel, while being vendor agnostic and energy efficient, is critical.

Broadcom, via its TruManage technology, offers an innovative solution to address IT managers' needs without the trade-offs inherent in competing proprietary technologies. TruManage technology enables a reliable, secure, energy efficient and vendor-agnostic solution that can be deployed on desktop PCs, laptops and workstations, in small, medium and large businesses. Broadcom TruManage technology is available from major PC OEM vendors.