

# Delivering standards-based solutions for Network Equipment Providers with Red Hat Enterprise Linux and HP



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## Executive summary

The telecommunications industry is changing at a fast pace. As subscribers seek better and more innovative services for voice, video and data, Communications Service Providers (CSPs) must focus on retaining and acquiring customers while driving operational efficiency. To stay ahead of the competition, successful Network Equipment Providers (NEPs) and service and content providers need a flexible, high-performance, high-density platform that can support next generation services transferred seamlessly across any network and delivered on any device, anywhere in the world.

To meet the needs for a high-density platform for next-generation networks, HP offers a range of open, standards-based carrier-grade platforms designed specifically to deliver robust performance and easy manageability for demanding telecommunications environments. The HP Advanced Open telecom Platform (AOTP) solution framework provides the industry's most comprehensive ecosystem of standards-based commercial and carrier-grade platforms, including blade servers, rack-mount servers, and 32- and 64-bit architectures. AOTP uses open, standards-based, commercial off-the-shelf (COTS) technologies are then integrated and hardened by HP to provide cost-effective reliability and agility for even the most demanding voice, data, and media network operating environments. This HP hardening encompasses carrier-grade Red Hat Enterprise Linux, telecom network software, Service Availability Forum™ (SAF)-compliant management and High Availability (HA) software, platform testing and validation, consulting and integration services, and customer support. Certified at Network Equipment Building System (NEBS) Level 3 and other national and international telecom standards, these platforms offer unshakeable reliability for failover and redundancy. Their combination of impressive performance, low cost and flexible architecture makes them optimal platforms for both existing and next-generation services.

Within AOTP, HP offers an AdvancedTCA blade server platform. Based on PCI Industrial Computer Manufacturers Group (PICMG) standards and Linux, the HP ATCA blade server platform features an AdvancedTCA chassis with redundant shelf management, highly available and extensible switching infrastructure, a broad selection of 32- and 64-bit server blades, multiple storage solutions, and a configurable AMC carrier blade with critically important telecom IO interfaces—all delivered in a high-density, highly-reliable telecommunications platform. HP has designated Red Hat Enterprise Linux as the preferred carrier-grade operating system for AOTP because Linux delivers flexibility and choice with the necessary scalability and performance of standards-based platforms—minus the risk and overbearing cost of proprietary systems. Red Hat Enterprise Linux also provides lower cost of purchase and vast independent software vendor (ISV) support. Red Hat Enterprise Linux was selected as the preferred operating system for the HP AdvancedTCA Blade Server based on its ability to meet the strict performance, reliability and security requirements demanded by service providers and carriers.

The Red Hat Enterprise Linux product family has been deployed in mission-critical applications for leading communications service providers worldwide. Service providers, equipment manufacturers, and other vendors actively participate in the planning and definition of the feature roadmap for Enterprise Linux to ensure that future releases have the high-priority features required by the telecommunications industry. Red Hat has also reviewed the Linux Profile published by the SCOPE Alliance and will use it as a guideline for defining future telecommunications requirements.

As a company with 25 years of experience in voice and data networks, the partnership with Red Hat places HP in a unique position to drive the adoption of open platforms across the telecommunications industry. Modular, standards-based technologies are the foundation of HP's Adaptive Enterprise strategy to synchronize business with IT—and these fundamental concepts are key elements of AOTP as well. With AOTP, HP and network equipment providers can build modular solutions that give operators the agility they need to increase revenue through new services and faster time-to-market—while reducing structural cost and risk.

## Section 1: Challenges in the NEP world

### Providing a high-density platform for next-generation networks

The telecommunications industry is changing at a fast pace. As subscribers seek better and more innovative services for voice, video and data, Communications Service Providers (CSPs) must focus on retaining and acquiring customers while driving operational efficiency. To stay ahead of the competition, successful Network Equipment Providers (NEPs) and service and content providers need a high-density platform that can gracefully support next generation services. And these solution platforms must be tested and proven to be reliable while adhering to the highest standards.

### The challenges for network equipment providers

The NEP world has undergone immense change, driven by deregulation and the convergence of technology and markets, as well as the ensuing competition. Building proprietary systems is expensive, and the move to standard platforms in telecom is all about costs and flexibility. Standards-based platforms provide reduced cost benefits in several areas through the entire program lifecycle. Leading NEPs are beginning to embrace the concept of a standards-based “communications server” that provides them with the opportunity to leverage open, standards-based platforms for new application and service development. This repositioning is rooted in the understanding by the NEPs that they can no longer provide significant differentiation on hardware platforms, operating systems and some components of high-availability (HA) middleware, but instead will create differentiation by turning their attention to the higher layers of the value chain. NEPs are moving to commercial, standards-based platforms and away from being equipment manufacturers. This allows NEPs to stay competitive as telecom solutions vendors without the costly burden of developing custom systems from the ground up.

### The standards-based communication server

To meet the needs for a high-density platform for next-generation networks, HP offers a range of open, standards-based carrier-grade platforms that are designed specifically to deliver robust performance and easy manageability for demanding telecommunications environments. HP’s open, standards-based platforms reduce maintenance costs and simplify integration to deliver rapid return on investment. The evolving marketplace demands quick response to shifting consumer desires, and HP carrier-grade platforms provide the flexibility to quickly reconfigure servers as new business opportunities arise. Standards-based platforms enable solutions and services to be developed and deployed more rapidly—and at lower cost—than with proprietary systems.

HP offers Network Equipment Building Standard (NEBS) Level 3-certified hardware that addresses a wide range of operator requirements at multiple price points, from entry-level IA-32 servers to high-end 64-bit Itanium® 2 servers, and with a choice of operating systems. HP carrier-grade systems are based on the Intel® processor architecture, AdvancedTCA® (Advanced Telecom Computing Architecture), carrier-grade Red Hat Enterprise Linux, and Service Availability Forum (SAF)-compliant middleware. Solution continuity also is critical because providers must be assured of compatibility, efficiency and cost-control across their various service platforms. That’s why HP provides comprehensive lifecycle management services and maintains a rigorous change-management process to minimize component changes and ensure future product viability.

## Section 2: Advanced Open Telecom Platform

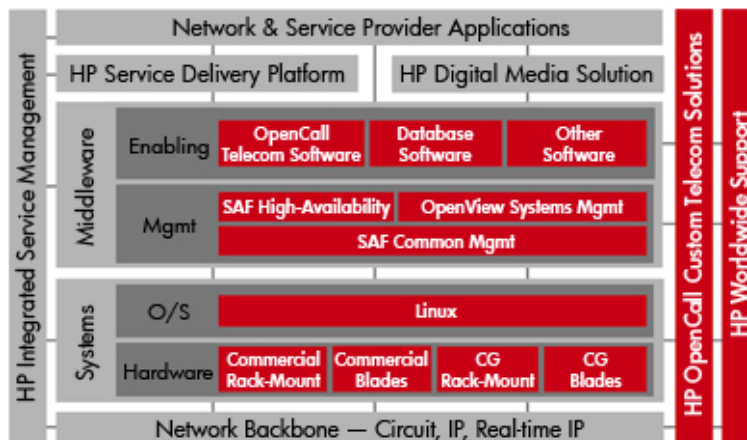
### The AOTP solution framework

The HP Advanced Open Telecom Platform (AOTP) solution framework is the logical way for communication service providers to achieve the best price/performance in next-generation, carrier-

grade telecom systems as they migrate to commercial off-the-shelf (COTS) carrier-grade products. The HP AOTP solution framework provides the industry's most comprehensive ecosystem of standards-based commercial and carrier-grade platforms, including blade servers, rack-mount servers, and 32- and 64-bit architectures. Open, standards-based COTS technologies are then hardened by HP to provide cost-effective reliability and agility for even the most demanding voice, data, and media network operating environments. This HP hardening encompasses carrier-grade Red Hat Enterprise Linux, telecom network software, SAF-compliant management and High Availability (HA) software, platform testing and validation, consulting and integration services, and customer support.

Telecom applications and network nodes have huge differences in their system requirements—processing power, operating system, high availability, database, telecom protocols, and packaging for different deployment environments, for example, computer rooms versus central office deployments. As a result, HP's AOTP program was developed working with a number of network equipment providers in response to their common platform initiatives based on the Linux operating system.

### HP Advanced Open Telecom Platform reference model



### Carrier-grade blade and rack-mount server platforms

Deployed within the AOTP framework, the field-proven, world-class HP carrier-grade server family includes both blades and rack-mount servers. Certified at NEBS Level 3 and other national and international telecom standards, these platforms offer unshakeable reliability for failover and redundancy.

#### HP rack-mount servers

The compact HP cc3310 carrier-grade server is based on IA-32 processors and tuned for the Linux operating system. It is modular and based on industry standards rather than proprietary components, saving time and money for service and network equipment providers.

The cx2620, HP's Itanium-based offering, is qualified with Red Hat Enterprise Linux 4.0 and the world-class HP-UX 11i operating system and is designed for the most demanding services and applications. It supports OpenCall SS7 middleware and provides a full high-availability implementation. This system has extensive features to support high reliability and availability.

#### AdvancedTCA blade server

Within AOTP, HP offers an AdvancedTCA blade server platform. Based on PCI Industrial Computer Manufacturers Group (PICMG) standards and Linux, the HP ATCA blade server platform features an AdvancedTCA chassis with redundant shelf management, highly available and extensible switching

infrastructure, a broad selection of 32- and 64-bit server blades, multiple storage solutions, and a configurable AMC carrier blade with critically important telecom IO interfaces—all delivered in a high-density, highly-reliable telecommunications platform.

### **AOTP ecosystem**

HP's Advance Open Telecom Platform portfolio is comprised of technology modules and building-block components that are based on open industry standards. The AOTP portfolio consists of hardware, operating system and software components. Each modular component is a COTS product in its own right and can be ordered as such. However, the powerful combination of the components that are pre-integrated by HP to fit specific needs provides the greatest value, re-use and harmonization across product lines.

The AOTP implementation of a common software environment and enabling technologies built on industry-standard interfaces across the HP product lines will simplify, harmonize and facilitate the reuse of modules and solutions across the server platforms. This allows HP and partners to develop modules and solutions for deployment on the right platform for the right solution in the right operations environment, while simplifying development, management and operation across the platforms.

### **HP value-added services**

As part of its comprehensive carrier-grade solution framework, HP offers a wide array of value-added services, so NEPs can focus on managing their business, not their infrastructure. HP acts as a reliable, single point of accountability—no matter where in the world a solution is deployed. HP value-added services encompass:

- HP Consulting and Integration (HP C&I)—One of the world's largest consulting and integration organizations, HP C&I is present in over 160 countries. HP C&I experts are qualified to engage in any effort, from conceptual studies to systems development and implementation.
- Quality assurance, testing and certification—HP carrier-grade systems are tested and certified to leading international standards, including Network Equipment Building System (NEBS) and European Telecommunications Standards Institute (ETSI), to ensure that they will operate under the most demanding environments and at a level of reliability required of in-network systems.
- HP OpenCall Custom Telecom Solutions—HP engineering services include detailed system specifications, custom development, compliance testing and certification, lifecycle management and migration management. Custom services include benchmark and infrastructure testing, proof of concept, and compatibility, conformity and interoperability testing. Supply chain services include design, catalog management, procurement, factory integration and delivery and logistics for both HP and non-HP equipment.
- HP and Intel Solutions Centers—HP and Intel jointly operate three Solutions Centers that invest in validating customer deployments around the world. In addition, these centers provide benchmarking, sizing and pilots to verify solution offerings in the market.
- HP Customer Support—HP Technology Services (HP TS) is the largest IT customer support organization in the world. HP TS works in conjunction with HP C&I and HP Managed Services to give customers 24x7 access to 65,000 HP service professionals and 70,000 service partners in 170 countries worldwide.

HP's end-to-end service solutions offer consistent quality and service levels across multiple platforms, including Linux. The hardware and software support offerings—from reactive to comprehensive to mission-critical—reduce the risks associated with downtime.

## Section 3: Red Hat Enterprise Linux

### Reliable foundation for carrier-grade systems

Red Hat Enterprise Linux is a carrier-grade operating system that meets the demanding availability, predictability and reliability requirements of Network Equipment Providers (NEPs) and Telco operators. Red Hat defines carrier-grade Linux requirements through collaboration with leading NEPs and Telco operators and alignment with the Linux Profile of the Scope Alliance. Red Hat offers a single OS distribution that supports both enterprise and telecommunications customer requirements and that supports an expanding ecosystem of certified hardware and software partners. Within that ecosystem, Red Hat Enterprise Linux was selected as the preferred operating system for the HP AdvancedTCA Blade Server based on its ability to meet the strict performance, reliability and security requirements demanded by service providers and carriers. With Red Hat Enterprise Linux, customers and partners get a carrier-grade operating system that is cost effective, flexible and open.

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"HP needed a carrier-quality and 'ready-to-run' operating system proven to address the demand for highly available, dependable and reliable communications platforms. Red Hat Enterprise Linux is powerful, versatile and proven across a host of industries, including telecommunications. We're pleased to be working with our longtime partner HP on the initiative and look forward to our continued collaboration in support of our shared customers."

Paul Cormier  
Executive Vice President of Engineering  
Red Hat, Inc.

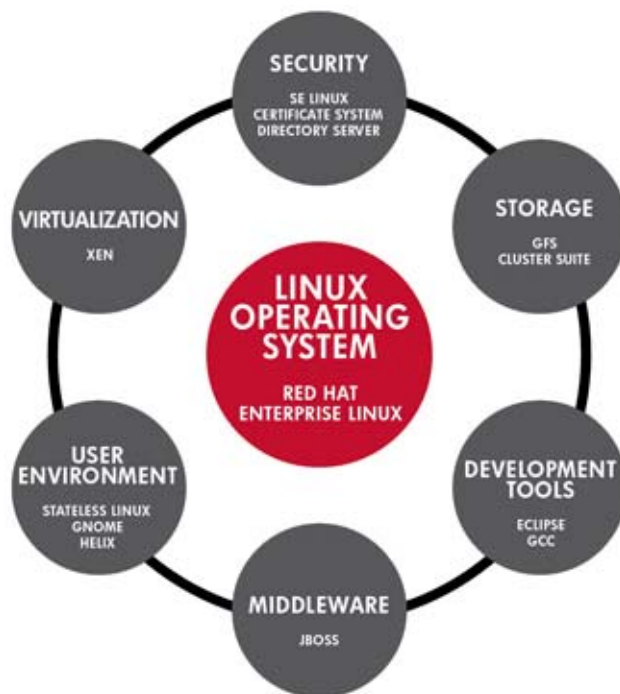
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#### **Carrier-grade-quality operating system**

Red Hat Enterprise Linux has been deployed in mission-critical applications for leading service providers worldwide. Service providers, equipment manufacturers, and other vendors actively participate in the planning and definition of the feature roadmap for Red Hat Enterprise Linux to ensure that future releases have the high-priority features required by the telecommunications industry. Red Hat also has reviewed the Linux Profile published by the SCOPE Alliance and will use it as a guideline for defining future telecommunications requirements. (SCOPE is an industry alliance committed to accelerating the deployment of carrier-grade base platforms for service provider applications.) Red Hat Enterprise Linux provides integrated carrier-grade platforms for Telco based on the value of its stability, performance, security and integration.

#### **Stability**

Red Hat, the worldwide market leader in Linux distribution, maintains a single Enterprise Linux distribution that supports both enterprise and carrier-grade technical and functional requirements by certifying that the operating system has been tested and hardened across a range of enterprise and telecommunications environments. Red Hat Enterprise Linux is a more stable distribution due to the focus on a commercial enterprise deployment, a predictable release cycle and a minimum seven year support for each release and through upstream development in the Fedora Project, where the latest open source technologies are packaged and released in a free Linux distribution. Red Hat Enterprise Linux includes the Fedora features that have been proven reliable and useful for enterprise and carrier-grade deployments.



### **Performance**

Red Hat Enterprise Linux delivers unparalleled system performance as a result of enhancements through the open source process as well as extensive testing and optimization with hardware and software partners. One method of measuring this success is by holding the world record in TPC-C performance benchmark for 8-way systems and TPC-C performance benchmark for a clustered configuration, both based on Intel Itanium 2 processor-based HP Integrity servers.

### **Security**

Red Hat Enterprise Linux provides market-leading security features including Security Enhanced Linux (SELinux), Exec Shield, PIE, and Auditing. Furthermore, Red Hat also guarantees maintenance including critical bug fixes and security updates for seven years from initial release of the product. In addition, Red Hat Enterprise Linux on HP ProLiant and HP Integrity servers has earned Common Criteria certification, an international ISO standard (ISO/IEC 15408) for security recognized by more than 23 governments around the world as a reliable means of determining the level of security of various technology products. This certification includes the Controlled Access Protection Profile (CAPP) at an evaluation assurance level (EAL) of 3+, similar to C2 certification under the previous U.S. National Computer Security Center (NCSC) Trusted Computer Systems Evaluation Criteria (TCSEC)—also known as “the Orange Book.” HP is also officially in evaluation with Red Hat Enterprise Linux 5 for Labeled Security Protection Profile (LSPP), Role Based Access Control Protection Profile (RBACPP) and CAPP at EAL4+. The LSPP EAL4+ is similar to the B1 certifications previously available under the U.S. Trusted Computer Systems Evaluation Criteria (TCSEC).

### **Integration**

Working with strategic partners like HP, Red Hat integrates all the necessary components of a carrier-grade telecommunications platform, including testing and certification of associate stack solutions and packaging of integrated ISO images as well as facilitating the ecosystem to ensure future platform functionality. Furthermore, JBoss, which is now a division of Red Hat, distributes the JBoss Enterprise

Middleware Suite. JEMS is used extensively in the telecommunications ecosystem and Service-Oriented Architecture (SOA) to speed time-to-market for the development of enterprise Java applications.

## Red Hat ISV ecosystem and Telecommunications Partner Program

Hundreds of telecommunications software providers already support Red Hat Enterprise Linux, and over the past six months, 29 more strategic telecommunications independent software vendors (ISVs) have partnered with Red Hat as part of the company's Telecommunications Partner Program. This is further evidence of Red Hat's success in targeting application providers in industry verticals where open source adoption is happening rapidly. The Red Hat Telecommunications Partner Program drives awareness and adoption of carrier-grade server platforms and solutions based on industry-standard hardware and Red Hat software. The Telecommunications Partner Program deepens Red Hat's relationships with leading NEPs, OEMs, telecommunications ISVs and operators, and packages Red Hat's new and existing capabilities into an integrated platform that can be leveraged easily across the telecommunications ecosystem.

Red Hat offers a complete service-oriented architecture solution, including Red Hat Enterprise Linux and JBoss Enterprise Middleware Suite (JEMS), enabling telecommunications companies to accelerate time-to-market with flexible, cost-effective solutions.

Red Hat works with leading NEPs, ISVs and operators to define requirements and ensure that Red Hat Enterprise Linux can be deployed in carrier-grade settings. Red Hat Enterprise Linux has been tested and hardened across thousands of enterprise and telecommunications environments, and it provides the stability, predictability and track record required by the industry. Operators and equipment providers actively participate in the planning and definition of future versions of Red Hat Enterprise Linux and verify that it meets the performance, reliability and security requirements of the industry. Operators also rely on Red Hat's hardware and software certification program to provide the level of structure, process and infrastructure needed to support the telecommunications ecosystem.

## Integrated support model

Knowledge, support and advice are critical elements of any technology company's delivery model, and HP and Red Hat can provide a wide array of open source and Linux services to address customer roll-out and long-term support requirements. Red Hat Global Client Services are divided into three key service areas.

### **Red Hat Professional Services**

Red Hat knows the challenges that customers face introducing and maintaining new platforms and applications. Red Hat consultants and engineers can bring substantial experience in a number of areas of expertise to enable solutions that leverage Red Hat Enterprise Linux. Red Hat Professional Services offers a full set of consulting services, from design, configuration, deployment, management and implementation right through to upgrade planning. Red Hat also offers custom engineering and support services for a wide range of technologies, including the GNUPro suite of development tools, the Cygwin Linux emulation package, and custom embedded Linux solutions for a variety of target platforms.

### **Red Hat Certified Engineer (RHCE) training**

Training and certification from Red Hat ensure that IT staff personnel are ready for serious Red Hat Enterprise Linux deployments, while leveraging the existing UNIX® skills they already have. It also helps businesses realize the full value of Red Hat-based solutions. RHCE certification assures a standard level of systems and network administration skills so that a person is ready from a technical point of view for professional responsibilities in setting up, configuring, and managing a Red Hat Linux server running common enterprise networking services and security. RHCE indicates that the person has passed a realistic performance-based lab exam that tests his/her ability to: install and

configure Red Hat Linux; understand limitations of hardware; configure basic networking and file systems for a network; configure the X Window System; perform essential Red Hat Linux system administration; configure basic security for a network server; set up and manage common enterprise networking (IP) services for the organization; and carry out server diagnostics and troubleshooting.

### **Global support services**

Red Hat's around-the-clock open source Software Support group provides highly-acclaimed production support as part of every Red Hat Enterprise Linux software subscription. HP Services supports Linux as a tier one platform, along with HP-UX and MS Windows. HP is a Red Hat Tier 1 partner and offers complete support and single point of accountability for Red Hat Enterprise Linux on HP servers. In fact, more than 99% of all open source and Linux service requests are resolved directly by HP, including those in support of Red Hat software subscriptions purchased through HP. Shielding the customer, HP works in close collaboration with Red Hat to resolve any remaining issues.

## **Migration to Linux**

HP has joined with Red Hat to offer migration and assessment services to ease the costs of migrating from Sun Solaris or other UNIX environments to Red Hat Enterprise Linux on HP systems. Migration services offered:

- Migration Assistance
- Proof of Concept
- Assessment Services

This program has helped a range of HP customers successfully move from Sun Solaris to Red Hat Enterprise Linux. These businesses now run solutions from Red Hat and HP that deliver superior business agility, improved ROI, and consistent manageability. HP and Red Hat provide everything needed to ensure a successful Linux deployment, including complete, tested and proven platform configurations, solution stacks, and high-availability clustering software. These solutions are delivered on powerful industry-standard HP systems, including access to HP and Red Hat consulting, integration, and support services.

## **Section 4: HP AdvancedTCA blade server**

### **High-performance, high-density carrier-grade technologies**

HP delivers the most extensive suite of telecommunications technologies available today, from entry-level IA-32, to high-end IA-64 NEBS systems running carrier-grade Linux, to enterprise servers running the Linux, HP-UX or NSK operating systems. Deployments of proven solutions include 40 of the top 50 service providers in the world that rely on HP OpenCall for core network functionality.

HP provides a broad selection of 32-bit and 64-bit AdvancedTCA systems based on PICMG (PCI Industrial Computer Manufacturers Group) standards and the Linux operating system. The HP ATCA blade server platform features the following:

- ATCA chassis with redundant shelf management
- Highly available and extensible switching infrastructure
- Configurable advanced mezzanine cards (AMCs)
- Telecom I/O interfaces

HP's range of pre-tested and proven ATCA products, solutions and services can be delivered quickly and efficiently. In addition, HP provides comprehensive platform customization and lifecycle management via the HP OpenCall Custom Telecom Solutions group.

## The HP ATCA blade server platform is the right choice

HP's comprehensive, integrated ATCA blade server platform, based on PICMG standards, makes sense for carrier-grade-quality telecom environments because it:

- Incorporates next-generation, industry-standard telecom components in a high-density, highly reliable platform
- Includes a full suite of ATCA hardware, telecom Linux, manageability tools, and global 24x7 services and support
- Complements the HP BladeSystem for enterprise computing and HP rack-mountable servers to create a server product family that meets product-deployment requirements and provides greater flexibility
- Comes from a single vendor—HP—so there's only one contact point for all services, support, and parts, allowing for enhanced focus on applications and services for next-generation networks

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## HP AOTP carrier-grade Linux platforms

Open, modular, high-density platform reduces complexity and increases speed of execution

- Industry standards result in high-performance, semi-custom platform for Service Providers
- Clearly defined blades roadmaps (32-bit and 64-bit options)



- Significant administration and operational support cost savings
- Up to 90% reduction in the time required to install, provision, and repurpose the servers

HP ATCA Platform  
with bc2100 Blades



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## Linux and the HP ATCA blade server platform deliver greater value

HP has designated carrier-grade Linux as the foundation for its ATCA blade server platform and Red Hat Enterprise Linux as the preferred operating system for the HP AdvancedTCA Blade Server because Linux delivers world-class functionality with the necessary flexibility, scalability and performance—minus the complexity, risk, and overbearing cost of proprietary systems.

### Simplified management

The HP bh5700 AdvancedTCA blade server's manageability subsystem includes a dedicated manageability processor for remote console service and remote system management. These facilities are always available, including when the host processor is down. The core of the bh5700's manageability includes an intelligent platform management interface (IPMI) subsystem for low-level hardware management.

### Simplified management of the network platform

In telecommunications networks, a distinction is often drawn between "network management," "element management," and "system management." This distinction exists because the telecom network operator produces revenue from the proper functioning of "the network," which is comprised of highly distributed, often inaccessible "elements." Typically, these elements are comprised of independent, multivendor "systems," each with its own personality and requisite interfaces. As a

result, the tasks related to “element management” (having to do with a particular functional node) are conjoined with the concept of “network management” (having to do with the performance of the network) and “system management” (having to do with a particular hardware/software subsystem). Management tasks for an element are often decomposed into:

- **Monitoring:** Remote reporting of operational statistics, inventory data and network-relevant events. Common operator requirements for monitoring network-level tasks are related to physical or geographical references, node fault collection and reporting, problem isolation, correlation of events, and marshalling of various resources into a single “view.”
- **Provisioning:** Remote configuration of performance characteristics and operational parameters to affect the flow of subscriber data. The provisioning of application-specific network elements is usually a complex and vendor-specific task accomplished by technicians with expertise specific to the platform in question.

In most telecom network deployments, “provisioning” is typically handled by the element management systems (EMS) which are supplied by the vendor of each functional node, whereas “monitoring” is performed by a separate network management system (NMS), using a variety of industry-standard technologies.

The HP vision on system management is that the market demands a seamless management environment regardless of the operating system and hardware platform. HP’s Advanced Open Telecom Platform provides this environment today, supporting carrier-grade Linux with commercial distribution from Red Hat across a portfolio of rack-mount and blade servers, both commercial and NEBS-compliant.

## Section 5: Maximizing your network investment

HP works closely with an extensive list of industry leaders to help drive standards and collaboration to advance technology and solution interoperability within the telecommunications ecosystem.

The PCI Industrial Computer Manufacturers Group (PICMG) is a consortium of over 450 companies that collaboratively develop open specifications for high-performance telecommunications and industrial computing applications. The members of the consortium have a long history of developing leading-edge products for these industries. Founded in 1994, PICMG's original mission was to extend the PCI standard for use in non-traditional computer markets such as industrial automation, medical, military and telecom. With the advent of fabric-based transports, PICMG specs have continued to evolve, resulting in a series of specifications that include AdvancedTCA.

The Service Availability Forum (SAF) is a consortium of industry-leading communications and computing companies working together to develop and publish high availability and management software interface specifications. The SA Forum then promotes and facilitates specification adoption by the industry.

Open Source Development Lab (OSDL)—sponsor of Linus Torvalds, the creator of the Linux kernel, and other key developers—is dedicated to accelerating the growth and adoption of Linux-based operating systems in the enterprise. Founded in 2000 and supported by a global consortium of major Linux customers and IT industry leaders, OSDL is a nonprofit organization that provides state-of-the-art computing and test facilities to developers around the world.

Together, the PICMG, SAF and the OSDL provide multi-dimensional building blocks, technical specifications, taxonomy and requirements enumeration. These building blocks become the foundation for the SCOPE Alliance, an association of leading network equipment providers whose founding members are Alcatel, Ericsson, Motorola, NEC, Nokia and Siemens. SCOPE provides the reference architecture, carrier-grade base platforms profiles, such as ATCA, CGL, and middleware. These SCOPE Alliance profiles prioritize the requirements and identify gaps in the industry

specifications. The Communications Platform Trade Association (CP-TA) “suppliers,” founded by Intel and Motorola, with HP as a sponsor, drive the delivery of building-block-level interoperability requirements and test procedures that comply with SCOPE Profiles through the CP-TA certification program.

Industry standards are the keys to ensuring the reusability of the architectural components across the wide range of telecom platforms and applications. These standards make it possible for a system developer to select COTS components based on the application requirements. Standard interfaces also allow a developer to change from one vendor’s product to another with less impact on the overall program, and to develop modular building blocks that meet industry requirements and provide an evolutionary path for developing standards. This collaboration is fundamental to the HP AOTP strategy of providing the right solution framework based on specific customer needs.

HP’s AOTP implementation of a common software environment and enabling technologies built on industry-standard interfaces simplifies, harmonizes and facilitates the re-use of modules and solutions across server platforms. These solutions deliver differentiated best-of breed, standards-based COTS components and meet the development needs of a wide range of telecom requirements. HP’s close work with leading ISVs helps to create an open environment that eases the integration of additional third-party products and emerging technologies. It also saves significant time in delivering solutions through pre-integrated code re-use, test tool integration, and deployment mechanisms.

## Red Hat and HP – investing in the next-generation network infrastructure

As a company with 25 years of experience in voice and data networks and ongoing partnerships with open source leaders like Red Hat, HP is in a unique position to bring to communications service providers the benefits of commercial off-the-shelf technology. Modular, standards based technologies are the foundation of HP’s Adaptive Enterprise strategy to synchronize business with IT—and these fundamental concepts are key elements of AOTP as well. With AOTP, HP and network equipment providers can build modular solutions that give operators the agility they need to increase revenue through new services and faster time-to-market—while reducing structural cost and risk.

As we have seen, AdvancedTCA platforms and Red Hat Enterprise Linux offer equipment manufacturers and network operators an exciting opportunity to accelerate next-generation network infrastructure at an excellent price/performance ratio. Linux has proved to be the operating system of choice and is rapidly supplanting conventional proprietary systems for demanding telecommunications applications.

Whether exploring HP blade server-based applications for Linux in a small test bed or planning a large, mission-critical implementation, HP has the leadership and experience in Linux and ATCA platforms to guide any size project toward success. As the recognized market share leader in Linux- and Intel-based platforms, HP has already demonstrated the power of this platform in building one of the world’s largest Linux-based supercomputers. Now, with the HP AdvancedTCA platform certified for NEBS Level 3 environments and carrier-grade Linux, HP has extended this powerful combination of technologies into the telecommunications environment.

## Leadership validated by the industry

HP believes that leadership in the open source community is important as a means to accelerate innovation for Linux and improve the support that organizations can obtain to maximize their results. Specific examples of HP leadership include:

- IA-64 Linux kernel—HP led the way in bringing the Linux kernel to the Itanium-based platform; in fact, HP engineers were the primary architects of the Linux kernel for the Intel Itanium processor and continue to maintain this work in the open source community. HP has offered a Software Developers Kit (SDK) for Itanium-based HP systems running Linux since 2000, and this kit has been distributed to more than 10,000 developers.

- Community—HP established the Gelato Federation ([www.gelato.org](http://www.gelato.org)), a worldwide consortium focused on enabling open source Itanium-based solutions for Linux for academic, government and industrial research. HP was a founding member of OSDL, the Linux Open Source Development Labs.
- Carrier-grade platforms—The HP commitment to Linux in the telecommunications arena has been recognized by multiple partnerships, co-development efforts and large deployments of critical wireless and wireline telecommunications infrastructure based on Linux and HP platforms.

## Red Hat and HP – creating NEP value

Telecommunications solutions are highly complex, and service and equipment providers alike must deliver even more innovative services while keeping customers loyal and insulated from the complexities behind the services. In order to achieve this, service and equipment providers need strategic partners that can do more.

The leadership of Red Hat in carrier-grade Linux and HP in NEBS system definition, validation and certification provides a partnership that brings extensive experience to bear on developing telecommunications solutions. HP has a rock-solid presence in over 170 countries, delivering high-volume, low-cost solutions via supply chain leverage and worldwide 24x7 service, support and management. HP and Red Hat systems are open and flexible, empowering customers to customize or create value-added services. By working with HP and Red Hat, service and equipment providers can save money, accelerate service deployment schedules, and ensure service integrity. This approach lets communications service providers place the focus where it belongs—on their subscribers.

### **The foundation for network transformation**

The flexibility and choice with AOTP, Red Hat Enterprise Linux and HP enterprise and carrier-grade hardware—along with enabling software, systems integration services, extended program/product management services and support—provide the common architecture to meet requirements of next-generation network solutions.

The partnership of Red Hat and HP is continuing to lead change in the communications service provider industry with solutions, technologies and services that are arrayed across network infrastructure, network services, operations and business support, mobile and rich media solutions, and end-user access.

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4AA1-0225ENUC, January 2007

