Brochure

# Orchestrate network infrastructure from a single console

HP Intelligent Management Center

If you're a network or IT administrator, you know the problems. You're dealing with a growing wave of enterprise video content, and your network is struggling to keep pace with exponential traffic increases and the shift toward Bring Your Own Device (BYOD). You're trying to address the escalating demands of the virtualized and cloud-ready data center. And you've seen how difficult—make that nearly impossible—it is for network IT to secure and orchestrate services in the virtual cloud and the virtualized workplace.

At the same time, your customers' expectations are higher. Today's enterprise users demand constant and immediate connectivity across wired and wireless links. They want access to business applications from their fixed and mobile workstations. And they expect to switch seamlessly and transparently from traditional IT to private and public clouds and back.

Figure 1. Typical budget allocation for IT organizations

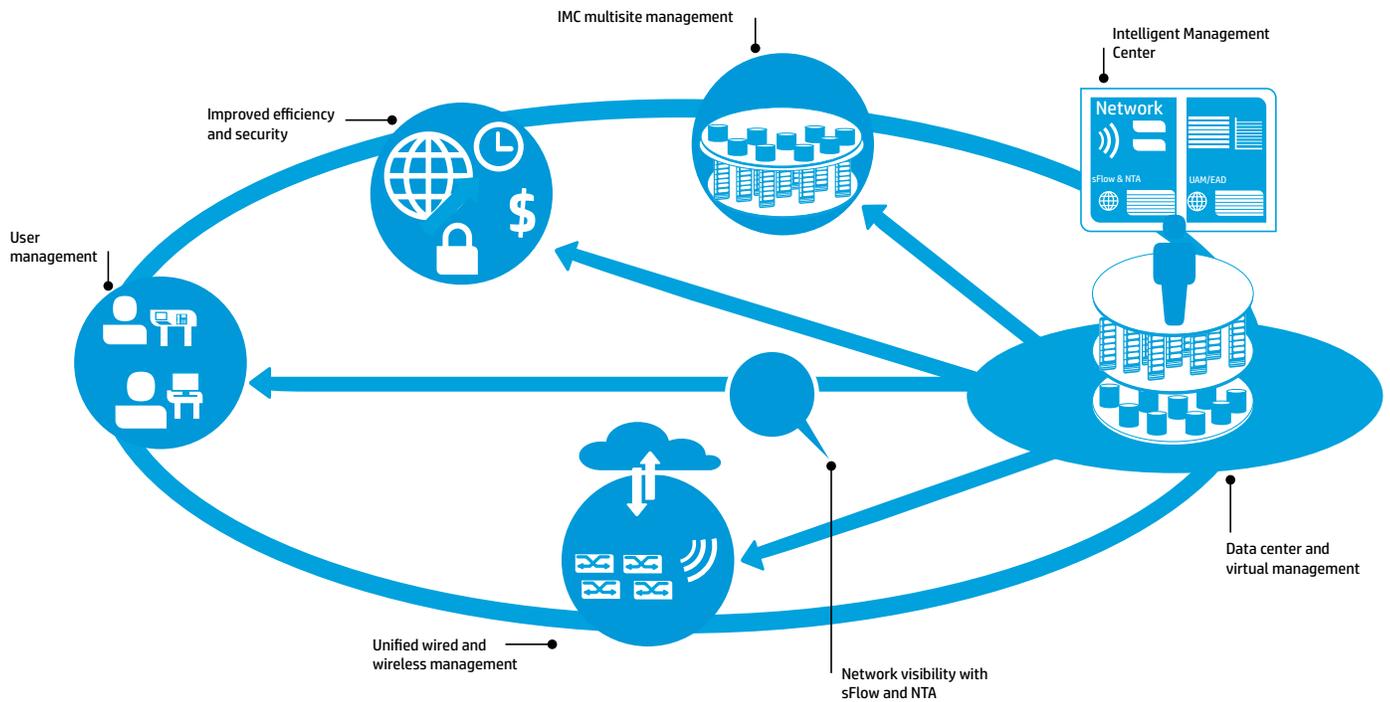New IT project initiatives

Ongoing IT operations
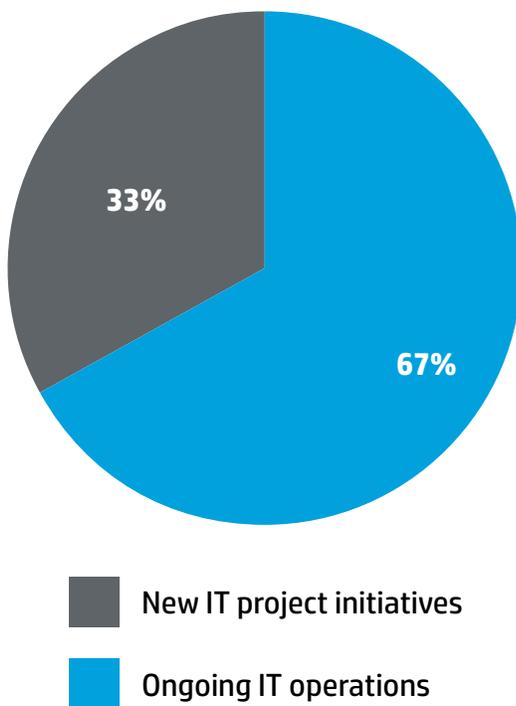
Keeping pace with these requirements is a tall order for the IT manager—one made no easier by "swivel chair management" which results from dependence on the mismatched management tools provided by network vendors. As a result, many organizations find that IT staff time and budget is overwhelmingly devoted to ongoing operations and maintenance instead of developing new initiatives and projects or expanding capacity to support business growth.

As you virtualize applications, there are expectations to speed the delivery of the application deployment. The current toolset for provisioning applications on most legacy networks is CLIs. The use of CLI is error prone, time consuming, and it lacks scalability. This operational model is in stark contrast with the model used by server administrators who are deploying virtual machines (VMs) and are using modern toolsets based on templates.

Solving such seemingly intractable problems calls for a new type of network management, one that combines a capability for single-pane-of-glass multivendor management with automated VM orchestration and automatic synchronization of network connectivity information. At HP, we call this FlexManagement. And it's available today with the HP Intelligent Management Center (IMC).

HP Intelligent Management Center (IMC) is a unified, single-pane infrastructure management solution that provides visibility across entire networks, enabling complete management of resources, services, and users. HP IMC unifies management of wired, wireless, physical, and virtual resources—and their users—leading to increased performance, enhanced security, and reduced infrastructure complexity and costs.

Figure 2. HP Intelligent Management Center (IMC)

IMC multisite management

Intelligent Management Center

Network

sFlow & NTA   UAM/EAD

Improved efficiency and security

User management

Data center and virtual management

Unified wired and wireless management

Network visibility with sFlow and NTA

HP IMC: making HP FlexManagement a reality

HP IMC is a comprehensive, modular platform with the flexibility and scalability to meet the needs of networks in the small- to medium-sized business (SMB) or the global enterprise arena. IMC delivers superior visibility and management by consolidating a host of traditionally separate management tools, including those for managing the network infrastructure, its services, and its users. Plus, IMC provides the vital orchestration needed for HP FlexManagement.

HP IMC integrated toolset covers the entire network, from the data center to the edge, even if it is geographically dispersed. And IMC supports the management of all HP Networking equipment as well as over 6,000 third-party devices from a variety of vendors.

In the data center, IMC provides insight into what is a "black hole" for many network administrators—the virtualized network environment. IMC offers new capabilities that allow its single-pane-of-glass multivendor management to automate VM orchestration and synchronize network connectivity information, helping bridge the management and operational divide between physical and virtual worlds.

At the network edge, in a campus or branch office, IMC offers converged wired and wireless infrastructure management, unified user access policies, and traffic analysis. The result is a substantial reduction in manual involvement by the IT department and time wasted on problem recognition.

"HP's IMC solution represents a mature, integrated approach for managing complex, multivendor, heavily virtualized infrastructures across multiple functional areas. IMC's integral support for security management sets it apart from the many others in the marketplace, as does its approach to covering the vast majority of management tasks within a single product."[1]

Managing the FlexNetwork

Built on a converged infrastructure of proven innovation, industry standards, and choice, the HP FlexNetwork architecture changes the rules of networking. FlexNetwork helps segment the network, enabling you to address challenges by aligning the network solutions you deploy to your business needs—all managed through a single pane of glass.

The unique architecture leverages a common set of technologies, products, and orchestration capabilities to deliver applications and services from the virtualized data center to the virtual and mobile workplace. It helps enterprises securely deploy and centrally orchestrate video, cloud, and mobile-enhanced architectures that scale from the data center to the network edge. FlexNetwork includes innovative technologies to:

- **Secure FlexFabric:** provides new virtualization-aware, high-performance security platforms to scale from the campus to a data center of virtualized servers without adding devices and complexity
- **Deliver FlexCampus:** provides unparalleled enterprise network performance, scale, and agility, maintaining delivery of business video and multimedia content from the cloud to the converged wired/wireless edge for a theater-quality user experience
- **Orchestrate through FlexManagement:** accelerates application deployment from weeks to minutes with Virtual Application Networks Manager through policy based network orchestration and automation

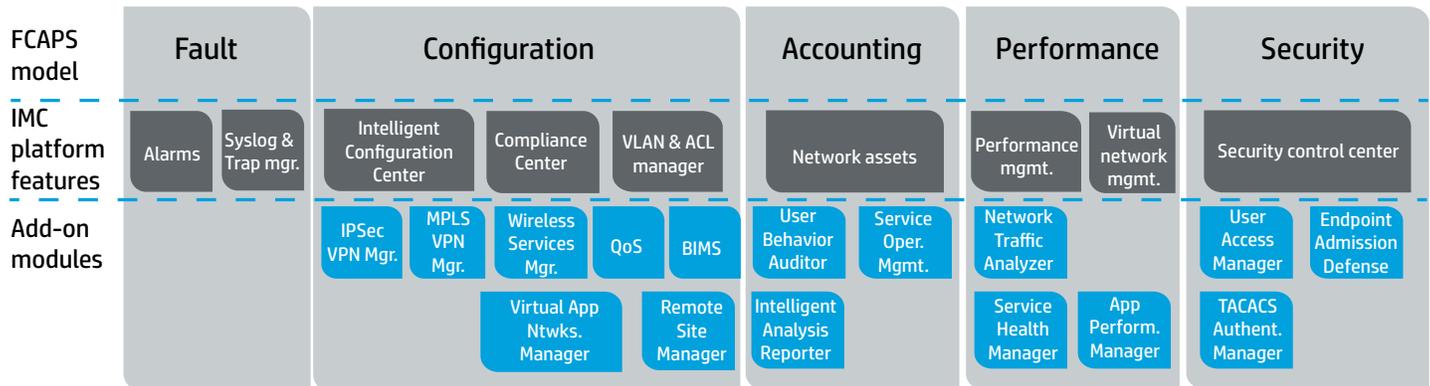## Aligns with industry standards

HP IMC aligns with all areas of the ISO Telecommunications Management Network's highly regarded Fault, Configuration, Accounting, Performance, and Security model (FCAPS). It also supports the IT Infrastructure Library (ITIL) operational center of excellence IT practices model, and relies on a service-oriented architecture (SOA) framework to provide unparalleled resource, service, and user management.

Scales and expands with the network

An IMC deployment begins with a base management system, either IMC Standard for single-network deployments, or IMC Enterprise that is a "manager of managers" for controlling immense or geographically distributed networks. In most cases, the base platform is all you need—the platform is highly flexible, and a single server can manage networks up to 10,000 nodes in size. While the base platform provides a broad set of features, you can choose from an "a la carte" menu of additional software modules to gain a deeper level of functionality across the FCAPS model. Functions you can add include sophisticated traffic analysis, secure access management with any type of device, endpoint posturing, powerful wireless management, and extensive quality of service (QoS) or service-level agreement (SLA) management. You can quickly deploy applications by automating VM connectivity and their performance, and monitor the impact to the network. Same goes for devices, which you can remotely deploy and manage in a secure fashion. You can add multiprotocol label switching (MPLS) and IPSec VPN management, too. You can even add service health monitoring and service operations to provide full IT workflow management from problem recognition, ticket creation, and problem resolution—all the way to knowledge base creation. In short, HP IMC is a single solution that knits together all your infrastructure management in a single console.

[1] Seven Priorities for Integrated Network Management: How HP Intelligent Management Center Delivers an Enterprise-class Solution, ENTERPRISE MANAGEMENT ASSOCIATES (EMA) white paper, March 2011.

Figure 3. IMC features map directly to the FCAPS model

FCAPS model	Fault		Configuration			Accounting		Performance		Security	
IMC platform features	Alarms	Syslog & Trap mgr.	Intelligent Configuration Center	Compliance Center	VLAN & ACL manager	Network assets		Performance mgmt.	Virtual network mgmt.	Security control center	
Add-on modules			IPSec VPN Mgr. / MPLS VPN Mgr. / Wireless Services Mgr. / QoS / BIMS			User Behavior Auditor	Service Oper. Mgmt.	Network Traffic Analyzer		User Access Manager	Endpoint Admission Defense
			Virtual App Ntwks. Manager		Remote Site Manager	Intelligent Analysis Reporter		Service Health Manager	App Perform. Manager	TACACS Authent. Manager	

Answers the hard questions

HP IMC answers questions like these:

- What is the configuration state and software level of all my network resources?
- What is the network topology and state of each link and interface?
- How can I quickly deploy new network resources into my network while conforming to my company's standards?
- What applications are running in my network?
- Is my VLAN architecture intact, and how can I gain visibility to determine if changes are necessary, and where to add or prune?
- How can I audit all the adds, changes, and deletions to all of my network resources?
- How can I deliver important services, and how should I change resource deployment when services change?
- What traffic is affecting my network, and who or what is consuming bandwidth?
- Where am I over- and undersubscribed?
- Which users need to be controlled, and how?
- How can I link the network to my organization's business processes?

Benefits of IMC

Here's what you can expect when you implement HP IMC for network management:

- Lower operating expenses and improved total cost of ownership, because of automated features, default alerts, and a consolidation of tools and correlated information

- Improved network availability and reliability that result in fewer trouble tickets, thanks to automated configuration management and comprehensive auditing
- Quicker problem recognition and troubleshooting through improved visibility
- Improved endpoint defense, control, and visibility
- Unified management between wired and wireless networks, and physical and virtual networks
- Excellent flexibility and scalability for networks of all sizes

Features of IMC

With its vast array of capabilities, IMC is uniquely able to simplify network management, even as it sifts through thousands of network nodes. IMC highlights the areas that need attention and provides insight and health information about the network as a whole.

Single-pane management

The single-pane management of HP IMC enables that you get the information you need at a glance, including a display of both physical and virtual assets and wired and wireless elements. Convenient color-coded views, topology overlays, and focused zooming make it easy to view the entire network or to concentrate on an area of interest.

Unified control of virtual and physical worlds

HP IMC unifies physical and virtual network management and helps IT overcome the challenges of administering the new virtual server edge. IMC brings you a wealth of capabilities enhanced for virtualization, including:

- Automatic discovery of VMs and virtual switches, as well as their relationships with the physical network
- Template-based approach for connection policy definition; automation and orchestration of VM network connectivity, thereby eliminating the manual provisioning process
- VM and virtual switch resource management, including the creation of virtual switches and port groups
- Virtual/physical topology views and status indicators for networks, workloads, and virtual switches
- Automatic reconfiguration when virtual workloads are moved within and across the data center
- Network policies remain bound to VMs during migration

Thanks to features like these, HP IMC can help eliminate service interruptions caused by virtual/ physical network configuration errors, reduce administration and troubleshooting by providing unified management of physical and virtual network infrastructure through a single pane of glass, and ultimately accelerate the delivery of new applications and services by automating configuration of virtual and physical network infrastructures.

IMC maps the topology of the entire network, making it clear which devices are virtual and which are physical. Management focus and policies remain linked to virtual assets, even if those assets move.

Unified management of wired and wireless networks

HP IMC provides a unified view of wired and wireless networks with enhanced network performance monitoring and management. From access points to edge routers, administrators can manage these devices in a consistent manner using policies. IMC delivers role-based access and centralized policy enforcement for users and their devices. Identity-based access ensures that the appropriate security and policies are applied consistently to users, whether the user connects through a wired or wireless LAN.

Comprehensive multivendor support, including support for Cisco

HP IMC provides comprehensive management of network devices, including those from HP as well as from Cisco and other vendors. Management begins with the automatic discovery and mapping of all devices on the network, and is further enhanced by in-depth monitoring of those devices. Unlike some other solutions, IMC goes beyond monitoring and provides sophisticated management of multivendor equipment, as well as interoperability and cross-vendor communication.

Having a consolidated platform that covers multivendor support not only reduces the number of required management tools, it also increases the efficiency of troubleshooting and mean time to repair (MTTR) with correlated information. The efficiency gains with MTTR are due to the fact that the data is stored within a single database rather than across a disparate management architecture.

Powerful administration and control

With HP IMC comprehensive configuration and management tools now at your fingertips, managing individual devices in a serial, one-off fashion is outdated. What's more, with IMC you can view the health and state of VMs, provision VM connectivity with policy driven automation, migrate VMs while keeping network profiles intact, and recognize where virtual resources connect to the physical network.

After devices are deployed, your job is made easier by unified resource management, with color-coded displays that show at a glance if a device is out of service, also includes physical topology views that help technicians pinpoint the exact rack, slot, and device where trouble is occurring.

Flexible centralized reporting

HP IMC receives and logs SNMP traps and syslog reports, and can generate online and historical network performance information in highly adaptable report formats. A variety of informational methods deliver powerful fault finding and event generation.

Flexible historical reports provide the information you need for network trend analysis and capacity planning. You can easily create inventory reports as well that show network device details such as model, firmware, available memory, IP address, serial number, and more. Reports are run with a mouse click or can be scheduled to run at regular intervals. And you can view reports in a number of formats, including .pdf and .xls, and send them automatically via email.

> "HP's IMC solution represents a mature, integrated approach for managing complex, multivendor, heavily virtualized infrastructures across multiple functional areas."[2]

Hierarchical management

In forward-thinking organizations, larger and larger portions of the network are being combined in ways that actually make the network easier to manage. And even the standard version of IMC offers distributed management capabilities that allow multiple servers with different installed modules to retain the appearance of a single UI. The enterprise version provides the greatest span of control, with a hierarchical deployment mode that can extend visibility across multiple networks, multiple countries, and even multiple continents—all while acting as a "manager of managers." IMC is designed to handle many tens of thousands of users and offer them varying levels of access to network resources. For greater flexibility and convenience, you can combine the distributed and hierarchical modes of deployment.

Compliance Center

Compliance Center offers an event notification system that can take action for remediation based on user-defined policies. Policies can be setup to notify administrators of activities such as SNMP traffic, broadcast traffic, and others. Administrators can then take appropriate actions for remediation to ensure seamless network operations.

With Compliance Center, administrators can use a proactive approach to management with audit capabilities of HP IMC. IT can audit the infrastructure to ensure network consistency and that device configurations comply with policies defined in Compliance Center or other rules.

Trouble-free administration that transcends the network

HP IMC includes features designed specifically to make life easier for network administrators. This management solution is scalable from SMBs to SPs, so organizations undergoing dynamic change or transformation can be confident that their network administration will remain stable. As a software solution, IMC enables you to utilize your server of choice, and supports multiple operating systems—including Windows® XP, Windows® 2003 and 2008 Server, and Red Hat Linux. You can employ different backend databases, too, including MySQL, Microsoft® SQL Server and Oracle database.

IMC can link to other business solutions, including HP Software, making it a perfect solution for enterprise-wide management that encompasses business processes as well as the network. The combination of HP IMC with HP software gives HP an unrivalled total solution with massively scalable management, intelligent automation, and reporting capabilities across an entire converged infrastructure.

The base IMC toolkit up close

HP IMC is based on a service-oriented architecture (SOA) using a business application flow model as the core, and boasting a modularized on-demand design. The architecture enables efficient implementation of end-to-end network management, and the modular design allows effective integration of traditionally separate management tools, providing complete management of resources, services, and users.

Even if you don't go beyond IMC Standard or Enterprise, you gain a remarkable array of integrated management tools at your fingertips. The table shows this management platform's range of ready-to-use capabilities.

HP IMC ready-to-use capabilities

Management

- Overall management of HP and thousands of third-party vendor network resources such as routers and switches
- Network element-level management for data communications devices
- Management of network assets
- Management of VLAN resources
- Management of virtual network elements
- Management of guest accounts

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[2] HP Intelligent Management Center: Enterprise-class Integrated Network Management, Enterprise Management Associates white paper, February 2011.

Configuration

- Extraction, transformation, and loading of databases
- Configuration of access control lists for devices to implement flow control for network traffic
- Intelligent software upgrade management for network devices and device configurations

Monitoring and analysis

- Monitoring and analysis of network performance
- Monitoring of network events
- Monitoring and troubleshooting of network faults in real time
- Sampling and analysis of network performance data
- Analysis of data collected from managed devices to measure network service performance
- Collection, filtering, and analysis of device syslog messages

Reporting and scheduling

- Issuance and display of service reports
- Task scheduling
- Alarm generation

IMC modules for added value

In addition to the base IMC system, you can deploy additional modules with a wide range of specific management, analysis, and security capabilities. Here's a list of the value-add modules available with HP IMC:

User Access Manager (UAM) module
The User Access Manager module addresses one of the most compelling challenges in networking security: the discovery, provisioning, and monitoring of endpoints and users. The UAM module adds authentication and authorization for endpoints accessing the network edge, reducing vulnerabilities and security breaches. UAM also includes Simple Network Access Control to identify device type.

User Behavior Auditor (UBA) module
The addition of the User Behavior Module to IMC helps you deal with potential security threats from internal users. Leveraging and mining data from other IMC service modules, the UBA module provides an essential view for observing user activity, allowing you to discover and avoid potential network security risks.

Endpoint Admission Defense (EAD) module
The Endpoint Admission Defense (EAD) module reduces network vulnerabilities by integrating security policy management and endpoint posture assessment to identify and isolate risks right at the network edge. EAD can also provide continual monitoring of each endpoint's traffic, installed software, running processes, and registry changes.

Network Traffic Analyzer (NTA) module
The Network Traffic Analyzer (NTA) module provides easy-to-understand network traffic monitoring reports for a better understanding of your network's bandwidth utilization. This graphical network monitoring tool uses industry-supported traffic flow standards to provide real-time information about the top users and applications consuming network bandwidth.

Wireless Service Manager (WSM) module
The IMC Wireless Service Manager (WSM) module provides unified management of wired and wireless networks. With this module, you can add wireless network management functions into your existing wired network management system instead of establishing a new IT management platform, safeguarding your legacy network investment from obsolescence and reducing maintenance costs. Heat maps are available so one can optimize the layout for the best wireless performance.

Virtual Application Networks Manager module
The Virtual Application Networks Manager module accelerates the provisioning of cloud applications by delivering connection policy templates that are defined in IMC and are available for use in the VMware vCenter hypervisor manager through an IMC VAN Manager plug-in. Server administrators are now enabled to deploy VMs and connect them to the network automatically using the policies defined via the templates in IMC.

Service Health Manager module
The Service Health Manager (SHM) module enables you to graphically monitor the health of services based on quality indicators. Key performance indicators can be applied to various aspects of service delivery controlled by the infrastructure – from bandwidth, configuration, link performance, traffic patterns and more. Indicators are aggregated to key quality indicators, to provide information on overall service health, compliance to SLAs. This information allows network administrators to adjust network parameters to meet service delivery requirements.

Application Performance Manager module
The Application Performance Manager module provides key performance indicators which are based on the performance of various applications. When used with SHM, IMC Application Performance Manager provides you with a holistic view of the performance of your servers and applications. Applications supported include Microsoft Exchange, Oracle databases and a host of other databases and applications.

Branch Intelligent Management System
Branch Intelligent Management System module provides zero touch deployment for remote branch devices. It also offers resource, configuration, service, alarm, group, and privilege management. It allows the remote management of customer premise equipment (CPE) in the WAN.

Extended APIs
IMC Extended APIs include over 200 APIs that provide access to core platform services. IMC is built upon an open and extensible architectural platform that leverages representational state transfer (REST)-style Web services. These services enable third-party developers to create applications that interface with IMC.

Remote Site Manager module
The Remote Site Manager module manages remote sites securely that are behind a firewall/NAT proxy through the use of an IMC remote agents. These agents can manage and monitor the remote network, and apply policies and configurations to the remote network devices on behalf of the central IMC server. Only one port is required for communication back to the central IMC server.

TACACS Authentication Manager module
The TACACS Authentication Manager module provides basic authentication, authorization and accounting functions for network devices or users.

IPSec VPN Manager (IVM) module
The IPSec VPN Manager module reduces the complexity of deploying, monitoring, and managing IPSec virtual private networks. This module provides detailed accounts of the health and performance of the IPSec VPN, resulting in quicker problem recognition and resolution, and reduced time configuring and managing IPSec VPN devices. IPSec VPN Manager also includes templates for Dynamic VPN configuration.

Service Operations Manager (SOM) module
The Service Operations Manager module helps information technology departments with workflow management by providing control, measurement, and audit capabilities around configuration changes, fault identification, and recovery processes. Based on a Universal Configuration Management Database (UCMDB), SOM offers configurable flow management and options for self-service, including knowledge-based creation and user kiosk capabilities.

Quality of Service Manager (QoSM) module
The QoSM module provides real-time network detection of QoS configurations, enabling unified management of QoS policies. QoSM allows administrators to organize traffic into different classes based on configurable criteria to provide differentiated services as well as insight into committed access rates, generic traffic shaping, priority marking, and queue scheduling.

**MPLS/VPN Manager (MVM) module**
To facilitate the administration of heterogeneous private MPLS VPN connections, IMC offers the MPLS/VPN Manager (MVM). This module allows you to architecture, deploy network resources, monitor, and manage the MPLS VPN network. The MVM module provides management functions such as VPN auto discovery, topology, monitoring, auditing, performance evaluation, VPN deployment, and service deployment, enabling you to best allocate network resources. VPNs can be either manually added or automatically discovered.

Voice Services Manager (VSM) module
Adding a Voice Services Manager (VSM) module arms IMC with a comprehensive set of tools for easily and efficiently managing converged voice and data networks. The VSM module provides resource and service management for HP VCX Connect platforms, media gateways, and IP phones. VSM delivers exceptional value by reducing system maintenance costs, improving productivity and increasing user satisfaction.

Highlights of IMC management

Just a few of the single-pane-of-glass displays in IMC. Imagine how easy network management would be if you had tools like these:
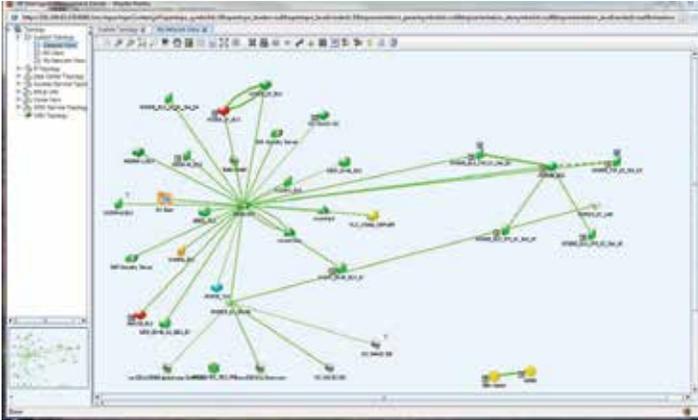
HP Intelligent Management Center (IMC) v5.0 automatically creates network topology layouts, with high-speed links shown as heavier lines, and features such as focused zooming. Different colors for active and offline devices identify problem areas at a glance.
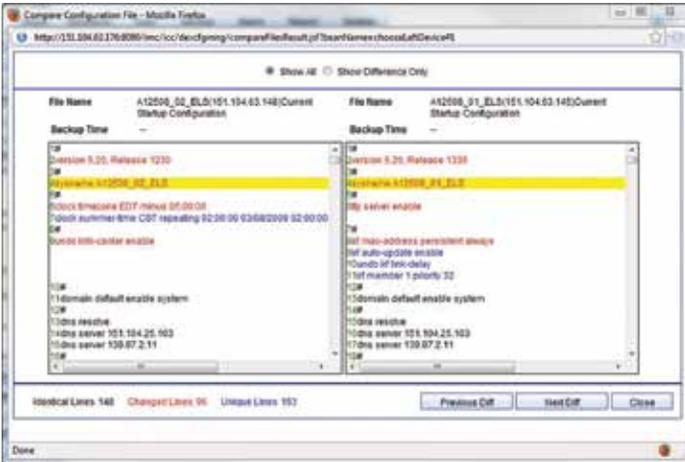

You can customize IMC's home page to show your choice of displays, data, alarms, and other important network and device information.


With IMC, you have real-time link management; this display shows information about the devices at each end of all network links.

IMC's handy configuration comparison tool is ideal for ferreting out problems caused by misconfigured devices.

The Network Traffic Analyzer add-on module gives you real-time insight into the total traffic flow between all network applications.
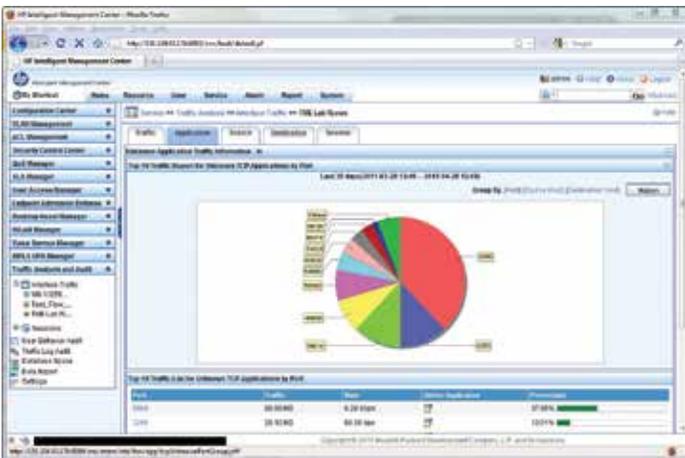
The Network Traffic Analyzer also lets you drill down to see specific traffic flows based on source, destination, session, or TCP application.

Based on industry case examples where multiple tools are replaced with singular, multifunction, multivendor integrated management platforms, operational cost savings can be dramatic. Some IT shops have reported dramatic reductions in administrative resource requirements, often halving staffing needs."[3]

Conclusion

It only makes sense that if you're trying to reduce complexity, depending on multiple tools is not the best way to manage consolidation. That's why HP IMC is the choice of so many efficiency-focused organizations. Standards-based IMC is the one management tool that provides the integrated toolset you need to architect, deploy, manage, and maintain your network to meet today's challenges and complexities. It pulls together wired, wireless, physical, and virtual environments under a single management umbrella. And it can reduce overhead costs while freeing IT staff time for new initiatives and projects that support business goals. Whether or not you're aiming for a mobile enterprise, HP IMC is the answer for your network of today—and tomorrow.

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[3] Seven Priorities for Integrated Network Management: How HP Intelligent Management Center Delivers an Enterprise-class Solution, ENTERPRISE MANAGEMENT ASSOCIATES (EMA) white paper, March 2011. Share with colleagues

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