Deliver

The cloud network
Executive Summary

Cloud computing has become a significant game-changer for organizations around the world. Deployed correctly, cloud computing can help transform business processes. It enables employees and partners to collaborate anywhere at anytime, using any device. It allows customers to interact with the business 24x7. Cloud computing not only helps organizations meet current business demands, it also helps them quickly discover and respond to new business opportunities.

The foundation of a successful cloud computing deployment is an agile and scalable network that’s built on open standards. However, legacy networks are rigid and inflexible. They were not designed for a cloud computing world. They cannot adequately handle the types of applications demanded by users today—for example, rich media, social media, and real-time interactions.

Legacy networks are at a breaking point. They are prohibiting organizations from benefiting fully from the cloud.

This brochure describes the characteristics of a network infrastructure that’s optimized for cloud computing. It describes why and how applications can be characterized for cloud computing environments. It explains how businesses can virtualize the network while validating the privacy and security of the applications. It also describes how orchestrating the network for cloud computing improves application deployment to meet users’ expected service levels.

Finally, this brochure describes the HP vision for cloud networks based on HP FlexNetwork architecture, a component of HP’s proven Converged Infrastructure, which integrates servers, storage, and networking onto a common platform.
People work on the go. Transactions are rapid-fire. Businesses run around the clock. Enterprises today are mobile, connected, interactive, immediate, and experiencing an explosion in the diversity of data and users. Cloud computing, mobility, and real-time applications place unprecedented pressure on networks.

“The convergence of cloud, social, mobile, and information into a unified set of forces is shaping almost every IT-related decision,” says Gartner.¹

Cloud computing makes it possible to put applications and information in the right hands at the right time on nearly any device—and does so with greater scale and efficiency than ever before. Employees, contractors, and partners can access essential applications, and those applications reside anywhere—from the traditional data center to the private cloud, public cloud, or hybrid—and may span continents.

Virtualization is the stepping stone to the cloud, but as businesses have seen, virtualization fundamentally changes network traffic patterns. And that shift is having major implications for the data center network. Gartner says, “By 2014, network planners should expect more than 80 percent of traffic in the data center’s local area network (LAN) to be between servers.”²

Mobility is here to stay, as people work anywhere, anytime and stay constantly connected with colleagues, family, and friends. Bring your own device (BYOD) is trending fast. IDC reports that roughly twice as many smart mobile devices as laptops were shipped in 2011.³ IDC contends that the explosive growth of smartphones and tablets is forcing IT to re-evaluate how to support these devices in the workplace. IDC foresees, “2012 will see an increasing number of IT and network managers rethinking their wireless and wired networks to support the increased traffic needs from these mobile devices.”

While traditional enterprise applications are the lifeblood of corporate operations, voice, video, and unified communications are at the heart of collaboration. Real-time voice and video are demanding applications on the network.

According to Gartner: “Through to 2015, average bandwidth requirements among enterprises will grow at a rate of at least 30 to 50 percent per year depending on region, line-of-business, and so on.”⁴

Enterprises need an easy way to accelerate and simplify the transition to the cloud. That smooth transition is based on the prediction of having a scalable, agile, and secure network that simultaneously streamlines IT operations.

Watch the Gartner-HP Webcast: Virtualization, Cloud Computing and Convergence Trends in the Data Center and Beyond

Cracks in the network foundation

Enterprises have invested significantly in their networks. “The enterprise network continues to be a relatively high expense for most enterprises, with, on average, 17 percent of overall IT spending,” according to Gartner. Despite the investment, there is ongoing dissatisfaction with the network’s ability to adapt to changing business needs.

The core problem is that networks have been designed the same way for decades, but the types of applications demanded by users—for example, rich media, social media, and mobility—has fundamentally changed. The legacy network architecture was created to support client/server applications in a bygone era when people tapped away on PCs at their desks and applications lived in the company’s data center. Now, employees, customers, and partners could be accessing your applications from almost anywhere—from headquarters, the campus, branch offices, or from any remote location—and the applications may be in a traditional or cloud data center.

Traditionally, the network was largely set-and-forget. Network devices were configured individually and changes were few. Planning for growth in users and applications was met by over-provisioning the network. The network perimeter was clearly defined and well-protected.

The explosion of the cloud creates new opportunities and a new set of challenges. Networks must be faster and more flexible to support the needs of diverse mobile users, a fragmented security perimeter, and a constantly changing set of applications and devices.

This new reality has created a breaking point for legacy networks because they are:

- **Application-indifferent**
  Legacy networks forward packets in a void without the context of the seemingly infinite and constantly changing set of applications and devices used.

- **Rigid and inflexible**
  Legacy networks are designed for one tenant, one user type, one location type, one application class, and one service-level agreement (SLA). They lack programmability to meet a variety of needs.

- **Managed manually**
  Legacy networks are managed device-by-device, with complex command-line interfaces (CLIs) and scripting or by juggling multiple management applications. The network can no longer be set-and-forget, and a manual approach is costly and ineffective.

Cloud networks must be different

To accelerate the move to the cloud, applications must be characterized prior to connecting them to the network and opening up access to users. Characterizing applications first enables definition of the necessary network resources, verification of resource availability, and aligns the resources with the application—allowing the network to deliver the expected service level.

Virtualization technologies brought new efficiencies to servers and storage. Similarly, virtualizing the network will create new levels of flexibility and efficiency that are essential for cloud networks. Network virtualization gives IT a control plane for the network—from the application to the user—in the same way the hypervisor gave IT a control plane for the server. Multiple applications and services can share the same infrastructure, while ensuring each gets the network resources it needs based on pre-defined policies.

Network virtualization allows IT to separate the logical provisioning and physical management of network resources. This enables the shift to automating orchestration of the network, rather than having IT staff toil in the engine room. Orchestrating the network speeds application delivery and verifies that all aspects of the policy are aligned to the application so it meets the users’ expected service level.

With virtual networking, the network can gracefully adapt to the needs of different tenants, users, applications, and devices. IT no longer has to build and manage inflexible overlay networks to accommodate the need for wired, wireless, and secure remote connectivity. Employees, contractors, and partners have easy access to the information they need, while security risks are more effectively mitigated.

While there are some approaches in the market that have attempted to address these issues, they have only managed to create more complexity by adding an overlay network and have not addressed how to:

- Deliver an end-to-end SLA for each application at the same time as offering secure multi-tenancy
- Accelerate provisioning of applications and minimize downtime caused by configuration errors
- Manage the consumption of an application once it is provisioned

---

The HP vision for cloud networks

HP is changing the rules of networking with HP FlexNetwork architecture, a component of HP’s proven Converged Infrastructure. HP FlexNetwork is the only converged architecture that connects the data center—where applications are generated, to the campus and branch—where users consume them. The FlexNetwork architecture allows networks to be open, scalable, secure, agile, and consistent. With FlexNetwork, HP is delivering a clear and achievable path to the cloud.

The HP Virtual Application Networks is a complete, end-to-end solution that enables businesses to create a scalable, agile, and secure network that streamlines operations. An integrated module to FlexManagement, the HP VAN Manager is designed to characterize applications, virtualize the network to align the resources needed for delivering the application, and automate the orchestration. Together, HP FlexNetwork and HP Virtual Application Networks enable organizations to accelerate their move to the cloud.

HP Virtual Application Networks simplify the deployment of cloud networks and accelerate the move of applications to the cloud. By virtualizing the network, different Virtual Application Networks can be used to meet particular application requirements such as for voice, financial transactions, or video over a secure shared infrastructure. Virtual Application Networks also support a multi-tenant model, in which each is dedicated to business units or companies.

With Virtual Application Networks, businesses can separate the deployment of applications on the network from the management of the physical infrastructure. That gives IT the freedom to focus on connecting users to applications—and the subsequent quality of experience—rather than on the details of configuring network devices.

To enable network flexibility and multivendor networks, HP integrates new open standards for software-defined network (SDN) technologies—including OpenFlow—into HP FlexNetwork and Virtual Application Networks. With OpenFlow, organizations can adapt their multivendor network environments with FlexNetwork architecture and Virtual Application Networks to meet the dynamic business needs of the cloud without the risk of being locked in.

With Virtual Application Networks, your IT team can provision network services faster, more consistently, and more securely. You can also reduce downtime and manual errors.

Together, HP FlexNetwork architecture and Virtual Application Networks create a unified platform for the dynamic and rapid deployment of cloud applications and services. The result is an application-aware, agile, and automated network that delivers a clear and achievable path to the cloud.
Virtual Application Networks

Three Steps to Cloud Networks

The Virtual Application Networks solution allows businesses to characterize, virtualize, and orchestrate the network.

• **Characterize**
  
  The HP VAN Manager uses preconfigured templates to simplify the characterization of an application including bandwidth, priority, access control, and security policies to simplify design and verify it meets the requirements of delivering the application to users. The policies associated with a Virtual Application Network follow it wherever it is in a global network.

• **Virtualize**
  
  By virtualizing the network, businesses can create a multi-tenant network with the necessary levels of isolation, security, and privacy so that multiple applications can be delivered from public and private cloud data centers over a single network. IT can unify network access for all types of users, whether employees, contractors, or partners—and ensure that security is applied consistently and appropriately regardless of the method of network access—wired, wireless, or VPN over the Internet.

• **Orchestrate**
  
  The VAN Manager enables IT to shift from device-by-device management to network orchestration. IT can rapidly and dynamically connect users to applications and services. The VAN Manager module runs on the HP Intelligent Management Center (IMC), which is the single-pane-of-glass management platform for the FlexNetwork architecture. With open and extensible APIs, other network components such as servers, storage, security, and application delivery controllers can be instrumented to simplify orchestration using IMC.
The HP advantage for delivering the cloud

HP FlexNetwork is an open-standards approach that lets businesses migrate from proprietary legacy products to flexible, open solutions at their own pace. Virtual Application Networks build on the FlexNetwork architecture and are tuned to the delivery requirements of an application. Virtual Application Networks extend from the data center—where the application is generated, to the campus and branch—where it is consumed by users. FlexNetwork Architecture and Virtual Application Networks help ensure enterprises have a consistent set of tools and architectural constructs that provide greater network visibility, better network planning, and enhanced troubleshooting capabilities.

HP Technology Services offers consulting services that help IT organizations transition to the cloud. Network Consulting Services for Cloud-Ready Networks provides customers with expertise, reference architectures, and proven methodology focused on people, process, and technology. HP Technology Services consultants leverage expertise from thousands of different IT transformation projects across the world, and its own recent data center transformation.

HP Financial Services offers a range of products and services tailored to your needs. From simple equipment acquisitions to global data center transformations, we can tailor a financing and asset management solution that’s right for your business. With companies everywhere facing reduced budgets, let us help you free up capital without limiting your investment in IT innovation.

Learn more about HP Financial Services

To learn more about HP products, contact your HP sales representative. For more information on HP Networking visit hp.com/go/networking

Learn more about extensible and open single-pane-of-glass management in the HP Intelligent Management Center (Enterprise Platform) Extended APIs (eAPIs) Brochure

Learn more about Cloud Network Maps for the data center

Learn more about virtualized networks enabled by OpenFlow