Application Velocity 1.0 for Enterprise Applications

Customer Challenges

With an ever growing mobile and distributed (remote/branch office) workforce, application developers are being tasked to develop applications that can also be remotely accessed by this global workforce. Application developers, with a very basic understanding of networking, assume the network has no boundaries and applications perform optimally regardless of the mode of access. At the same time, cloud computing is enabling applications to be consolidated into centralized and virtualized data centers, further increasing the distance from where the applications are being accessed.

Network architects are also being challenged with current network designs for this application deployment and delivery model. The available bandwidth is being taxed as the ever growing applications portfolio competes for network resources to provide a satisfying user experience across the network without boundaries. This application delivery model also demands capabilities for better visibility and control, WAN optimization, and agility of the network to rapidly deploy and manage enterprise applications.

Cisco Application Velocity Solution

The Cisco Application Velocity solution addresses all the challenges associated with the delivery and consumption of applications over the network without boundaries. It is one of the five services in Cisco's Borderless Network Architecture and is composed of innovative Cisco technologies that help IT professionals meet or exceed business SLAs, maximize user experience, optimize resource utilization, and increase reliability and user expectations through:

- Visibility and Control—Large-scale, network-integrated application classification and control, performance monitoring, analytics, and management
- Acceleration and Optimization—Industry leading WAN optimization and advanced application acceleration solutions, along with efficient content distribution
- Network and Application Agility—Support for cloud-based services and virtualized branch infrastructure through enhanced application survivability and network and end-point reliability

Cisco Validated Design (CVD) for Application Velocity

CVDs serve as end-to-end, validated architectures showcasing how different technologies work together as a solution to cost effectively solve customer problems. Cisco has developed an Application Velocity CVD to showcase the benefits of the solution. The CVD proves how the various technology components fit together and provide application-focused network visibility and control, application acceleration and optimization, and network and application agility.

Table 1 shows the three pillars for the application velocity solution and the key enabling Cisco technologies validated in version 1.0 of the CVD. These enabling technologies help network architects and operators to design and manage networks with application-aware optimization and best-in-class end user experience. The complete list of all application velocity enabling technologies can be found at: http://www.cisco.com/en/US/solutions/ns1015/application_velocity.html#~Products.

Table 1 Application Velocity Pillars and Cisco Technologies Validated in Version 1.0 of the CVD

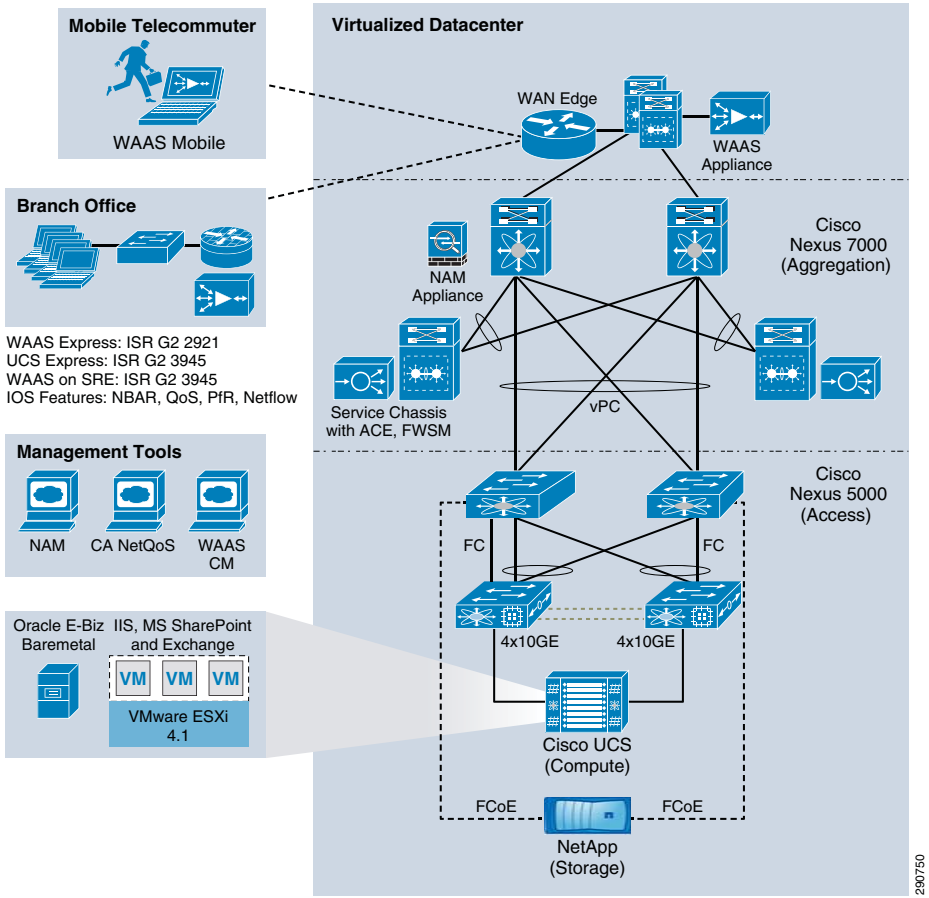
Application Velocity Key Pillars	Cisco Products and Technologies
Visibility and Control	Discovery, Prioritization, and Control NBAR, QoS Performance Monitoring NetFlow, NAM Analytics and Management WAAS CM, CA NetQoS
Acceleration and Optimization	Application Acceleration WAAS, WAAS on SRE, WAAS-Mobile Network Optimization and Utilization WAAS-Express
Network and Application Agility	Application Survivability UCS-Express Adaptability PfR Virtualization and Cloud Enablement UCS-Express

Solution Architecture (CVD Version 1.0)

Figure 1 depicts a very high-level architecture for Application Velocity CVD version 1.0. It showcases a typical enterprise with a primary virtualized data center hosting enterprise applications and a globally-distributed workforce (mobile and branch office users) accessing these applications remotely over The Internet and WAN. The popular Tier-1 enterprise applications validated in this version of the CVD include:

- VMware vSphere virtualized IIS Web Server
- Microsoft SharePoint 2010
- Microsoft Exchange 2010
- Oracle E-Business R12.1

Figure 1 Cisco Validated Design 1.0 Network Overview



Branch Office Architecture

The CVD showcases two branch offices with 100 and 10 users, respectively. To provide better visibility and control for the different Tier-1 applications being accessed over the WAN, both the branch offices showcase Cisco NetFlow, NBAR, and QoS capabilities. To provide acceleration and optimization for users accessing SharePoint files, E-mails, and Oracle E-Business forms and ledgers over the WAN, the branch office with 100 users showcases WAAS running on SRE modules on ISR G2 routers. The branch office with 10 users showcases the WAAS Express capability enabled on ISR G2 routers. The branch office with 100 users utilized PfR to provide network agility. A separate UCS-Express Node is deployed to showcase application agility.

Mobile Telecommuter Architecture

The CVD showcases up to 100 mobile users accessing the applications in the data center over the WAN. Cisco WAAS Mobile provides the desired WAN acceleration and optimization to achieve a best-in-class end user experience.

Data Center Architecture

The CVD showcases an end-to-end data center architecture with Cisco UCS B-Series Unified Computing, network attached storage, and Cisco Nexus (5000 and 1000) Unified Fabric hosting mixed applications workload (virtualized Exchange, SharePoint, IIS Web server, and baremetal Oracle). Cisco Nexus 7000 (with NAM appliance) and Catalyst 6500 (service chassis with Cisco ACE and FWSM) provides the switching and networking services capabilities at the data center aggregation layer. Catalyst 6500 router aggregating both the WAN and Internet traffic provides the routing and optimization capabilities for the traffic going to and from the remote workforce (branch offices/mobile telecommuters). To provide application focused network visibility and control, the CVD showcases Cisco NBAR, NetFlow, QoS, NAM, and CA NetQoS Performance Center. For WAN traffic acceleration and optimization, the CVD showcases the Cisco WAAS appliances attached to the Catalyst 6500 switch. To provide network and application agility, CVD showcases Cisco UCS-Express and Cisco PfR capabilities.

Application Velocity CVD Version 1.0 Validation

Solution validation was performed at the Cisco RTP campus, NC, USA with real-world workloads between applications hosted in the data center and accessed over a WAN by a global workforce.

- The Application Velocity visibility and control tools from Cisco highlighted in Figure 1 provided the capability to monitor and report the application traffic both before and after optimization achieved as a result of implementing Cisco WAAS technology. The tools helped monitor and analyze the application traffic throughput, latency, and potential retransmissions and to prioritize business critical traffic in case of congestion.
- Cisco WAAS technology helped achieve WAN acceleration and optimization of up to 90%[1] across different applications, helping achieve a better end user experience and bandwidth reduction.
- Windows 2008 VM with DNS and DHCP services running on UCS-Express and PfR helped with infrastructure consolidation and enhanced path selection at the branch office, thereby providing the desired application and network agility.

Additional Information

- Application Velocity Landing Page on cisco.com
  http://www.cisco.com/en/US/solutions/ns1015/application_velocity.html
- Application Velocity Whitepaper—A new holistic approach to Application Performance via Borderless Networks
  http://www.cisco.com/en/US/solutions/ns1015/lippis_white_paper_application_velocity.pdf
- Borderless Networks Landing Page on cisco.comhttp://www.cisco.com/en/US/netsol/ns1015/index.html
- Application Velocity 1.0 for Enterprise Applications (CVD)
  http://www.cisco.com/en/US/docs/solutions/Enterprise/Borderless_Networks/Application_Performance/AppVelocity.html

1. The bandwidth reduction percentage may vary for environments based on the different applications and associated data in the environment.