

## Benefits of a UC cloud solution from CRI

### Business Continuity

- Perform maintenance on underlying hardware while providing always-on access to UC applications
- Run applications in high-availability mode offering hitless failover
- Enable new end-to-end network resiliency with the deployment of the Avaya VENA Virtual Services Fabric within and between data centers

### Reduced Costs

- Reduce hardware maintenance costs by consolidating servers
- Lower power and cooling costs
- Use less rack space

### Increased Flexibility

- Deploy new applications faster and easier in a dynamic application and network environment
- Add network capacity, deploy new services and complete adds, moves and changes without re-engineering the core

### Increased IT efficiency

- Simple end point provisioning to support workload mobility
- Automated data center provisioning



The Power of We™



COMMUNICATION RESOURCES INC.

# Kick-start your transition to Cloud Computing

## Fault-tolerant cloud-based UC solutions from Avaya and Communication Resources Inc. (CRI)

Consolidation, convergence, virtualization and cloud computing are transforming the data center faster than any other time in history. Virtualization has significantly impacted the software and server industry and is now beginning to similarly impact networking and storage. According to Forrester Research<sup>1</sup>, organizations are virtualizing their data centers to gain better business continuity, achieve greater flexibility in reacting to market changes and end customer needs, and eliminate wasted resources.

The transition to a virtualized data center generally occurs in phases. The first phase – server virtualization and consolidation – is well underway. Gartner Group estimates that 35 million virtual machines (VMs) are already installed, which is up dramatically from the 10 million in 2009<sup>2</sup>. Gartner further estimates more than 75% of all servers will be virtualized by year-end 2015<sup>3</sup>. The next phase – VM mobility – will drive the virtualization of other data center aspects, including the network and storage capabilities.

Although the path to a virtualized data center and ultimately the private cloud might seem daunting, Avaya and DevConnect partner Communication Resources Incorporated (CRI) offer a complete turn key virtualized solution. It consists of virtualized Avaya Aura® Unified Communications (UC)

applications supported on a virtualized network infrastructure based on Avaya Virtual Enterprise Network Architecture (VENA). This solution creates a flexible, end-to-end fault tolerant UC environment to help enterprises achieve their business continuity objectives, reduce costs and increase responsiveness and IT efficiency.

## Virtualized Unified Communications Applications

Server virtualization has allowed an operating system and all the applications that run above it – together called a virtual machine – to be abstracted from the underlying physical server. This allows multiple virtual machines to run on a single physical server. By consolidating servers, and reducing power and cooling requirements, server virtualization can help enterprises save a significant amount of money.

<sup>1</sup>Kindness, Andre. "The Data Center Network Evolution: Five Reasons This Isn't Your Dad's Network." Infrastructure & Operations Professionals. December 15, 2010.

<sup>2</sup>Bittman, Thomas J. "Q&A: Six Misconceptions About Server Virtualization." Gartner Group Research. July 29, 2010.

<sup>3</sup>Bittman, Thomas J., and Lydia Leong. "Virtual Machines Will Slow in the Enterprise, Grow in the Cloud." Gartner Group Research. March 4, 2011.

Avaya and CRI offer a suite of virtualized UC solutions. Direct from Avaya is the Avaya Aura® Solution for Midsize Enterprise. This solution delivers virtualization technology for companies with 250 to 1,000 users. It allows midsize companies to support up to seven Avaya Aura® applications in parallel on a single server.

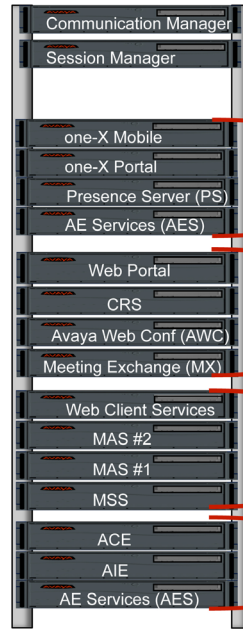
Additionally, CRI has virtualized many Avaya Aura applications including Avaya Modular Messaging, Avaya Conferencing and Avaya Agile Communications Environment® (ACE) software. CRI integrated servers are preloaded with the Avaya virtualized applications. This allows enterprises to purchase a single solution rather than several independent appliance-based solutions. Purchasing these virtualized UC applications as a turn-key solution helps businesses lower ongoing hardware maintenance costs, control server sprawl and achieve a more environmentally-sustainable solution that draws significantly less for power and cooling.

Although the cost savings from server consolidation can be considerable, it is not the most significant benefit. The real power of server virtualization comes with the sophisticated virtualization tools that enable virtual machines to move from server to server, within or across data centers. This requires using a host model consisting of memory and CPU resources with common storage (SAN). This is the foundation of offering Infrastructure as a Service (IaaS), and it provides the following key benefits:

### Business Continuity

- Maintenance - server teams can perform maintenance on underlying server hardware without taking an application out of service.
- Reliability - VMs can run in fault-tolerant (FT) mode, assigning a secondary server to execute the commands for the resident VMs if a failure occurs in the primary server.

### Traditional Avaya deployment



### CRI Virtual Deployment

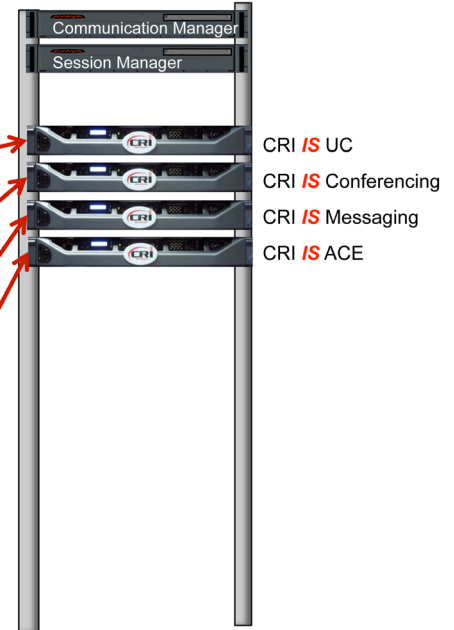


Figure 1: The Power of Virtualization - Reduce 15 hardware platforms to four

- Disaster Avoidance - VMs can move to servers in a different geographical location if a natural disaster threatens a particular data center.

### Dynamic Resource Scheduling

- Resource Allocation - VMs can move to a new host if an application requires more CPU resources than what is available on the current host.

In the CRI Enterprise Cloud, physical servers exist as pools of capacity to be accessed by any application that requires it. This design provides unparalleled flexibility in supporting different application requirements.

## Virtualized Network Infrastructure - the Backplane of the Data Center

For applications to move seamlessly within and between data centers, Layer 2 VLAN extensions are required within the data center as well as across the backbone infrastructure between data centers.

In today's traditional LAN/WAN design, the extension of VLANs and their propagation within data centers can prove challenging. Maintaining the proper configuration for all redundant links and switches can be a time-consuming operation. It can also introduce significant risk because the configuration of crucial core devices needs regular administration. This is especially true in data center environments that are continually shifting to match application and business requirements.

To simplify the creation of Layer 2 domains across the network, network operators are looking to next-generation virtualization technologies to create a network fabric that would be deployed within and between data centers. The Avaya solution uses enhanced IEEE 802.1aq Shortest Path Bridging (SPB) as the basis of its network fabric. The network fabric's main value is that once enabled, it takes only four simple point and clicks at the fabric edge where the servers are connected to create what Avaya calls a virtual service network. This virtual service network enables the seamless transfer of VMs between servers and data centers. The network

operator simply maps a VLAN to a virtual service network at the network edge, and through the fabric's robust link state protocol – based on IS-IS – the shortest path through the network is automatically provisioned.

This new dynamic infrastructure allows new virtual service networks to be configured and enabled within minutes, without needing to provision the devices and or uplinks within the network core. These networks can then be moved, changed, and turned on and off as VMs are activated, deactivated and moved across and between data centers. The result is a dynamic network that is synchronized to the dynamic application environment.

Additionally, enhanced IEEE 802.1aq Shortest Path Bridging offers sub-second end-to-end network restoration for carrying delay sensitive traffic such as Unified Communications

## Data Center Operations Tools - Bridging the Server and Network Environments

When deploying server virtualization, server administrators typically can view the virtualized server

environment while network operators can only view the network topology. This creates a challenge. When these two worlds remain separate, troubleshooting application performance and network connectivity issues can be a lengthy, inefficient process.

Data center operations tools, such as the Avaya Virtualization Provisioning Service (VPS), can bridge these two environments to deliver an end-to-end view of the virtualized data center from servers, to VMs, to networking devices. This can help streamline the troubleshooting process and ensure server and network operations teams work more effectively together.

Avaya VPS can also audit and track VMs throughout their lifecycle to provide relevant reporting information that may be lost in today's segmented world of virtualization. Finally, Avaya VPS can automate network device provisioning by following VMs as they migrate through the network. As VMs move from one server to the next, the appropriate port profiles (VLAN, QoS, ACLS) are added and deleted from the edge devices that are connected to the physical servers, helping ensure consistent application performance as VMs migrate between servers.

## Avaya VENA: a Simpler, More Dynamic and Adaptive Network

Deploying the Avaya VENA Virtual Services Fabric allows enterprises to greatly simplify how they create and configure networks—by requiring service provisioning only at the edge of the network. It relies on Intermediate System To Intermediate System (IS-IS), a proven carrier-grade link state protocol, to dynamically build the topology between nodes, which can help save network administrators time and effort, and virtually eliminate human error.

Network operators now have the flexibility to add network capacity or a new link, and have them be automatically discovered without impacting any existing services.

New services and changes to existing services can be done much more easily. Simply provision each end point and the network does the rest.

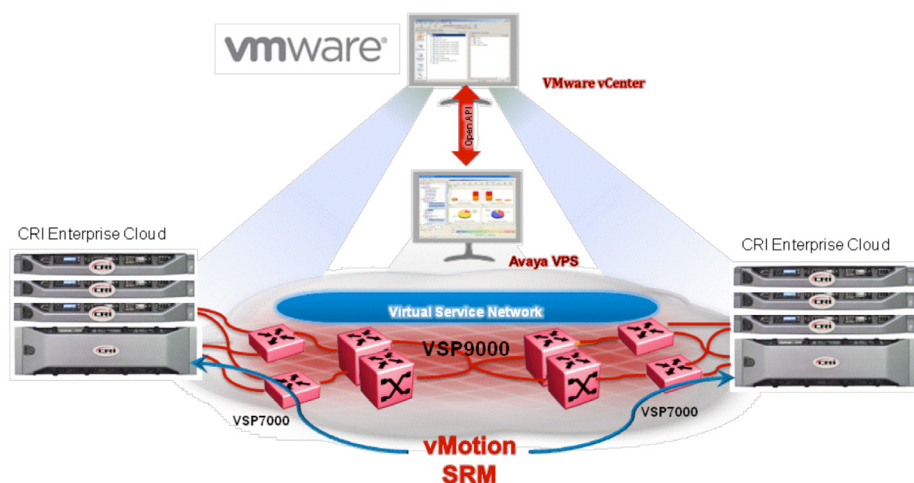


Figure 2: End-to-End UC Cloud Solution

## Learn More

To learn more about Avaya cloud-based UC solutions, contact your Avaya Account Manager or Avaya Authorized Partner. Or, visit us online at [avaya.com](http://avaya.com)

To learn more about CRI, please visit [www.crinj.com](http://www.crinj.com)

## About Avaya

Avaya is a global provider of business collaboration and communications solutions, providing unified communications, contact centers, data solutions and related services to companies of all sizes around the world. For more information please visit [www.avaya.com](http://www.avaya.com).

Avaya VPS is a plug-in component to Avaya Configuration and Orchestration Manager (COM), and uses Avaya COM for network device inventory, topology and configuration. In addition, it provides a relay mechanism to VMware's vCenter—the management system that CRI uses to oversee the virtualized UC environment. Avaya VPS transports information between vCenter and the Avaya COM to manage and view both the virtual server and network environment.

## Ensuring Fault-Tolerance

Business continuity is the number one reason enterprises turn to private cloud solutions. Therefore it is critical to show no end user impact to services under a number of failure scenarios. CRI has performed a number of tests within its Application Center, an environment that replicates a virtualized data center. The Application Center includes servers, a storage area network and Avaya Ethernet switches and management tools, divided into two separate physical locations.

CRI completed a number of tests to validate the Avaya Conferencing solution supporting 4,000 active ports would not drop a single call under several failure scenarios.

These scenarios included:

- Failure of the host server in fault tolerant mode
- Failure of a network component
- Loss of an entire data center

### Test Result #1 – Failure of a host server in fault tolerant mode

VMware fault tolerant configuration - if the host server fails, the Avaya Conferencing virtual machines will continue to operate using the secondary host without impacting the conferencing application. Testing by CRI validated that all 4,000 conference ports remained active in this scenario.

### Test Result #2 – Failure of a network component

Resilient network design - using switch clustering at the network core with the ability to dual home at the network edge, testing confirmed that the loss of an individual switch would not impact any of the 4,000 conference ports.

### Test Result #3 – Data center goes off-line

Disaster recovery design - if the primary data center is taken off-line, the alternate location can be up and running in a matter of minutes.

## Conclusion

CRI and Avaya are helping kick start the transition to the private cloud by offering a complete end-to-end solution – from the virtualized applications, to the virtualized network, to the data center operations tools that help manage and provision different aspects of the virtualized data center. This end-to-end cloud UC solution will help enterprises achieve their business continuity objectives, as well as reduce costs and enable a more flexible environment to increase responsiveness and IT efficiency.

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