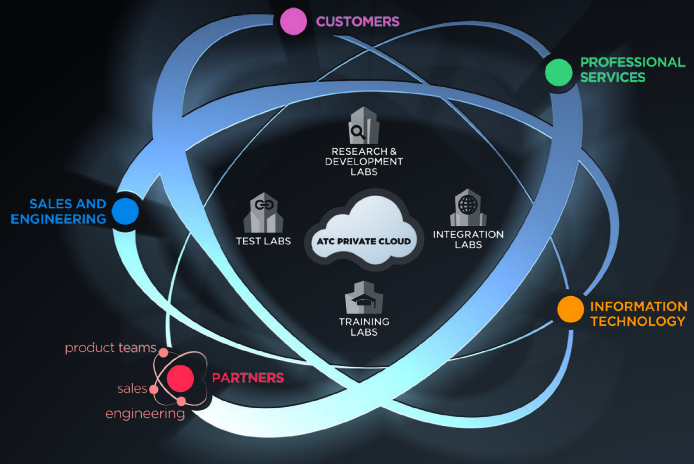
WWT SIMPLIFIES THE COMPLEX

ADVANCED TECHNOLOGY CENTER
TEST LABS: SOLUTION BRIEF



The Advanced Technology Center (ATC) is a collaborative ecosystem to design, build, demonstrate, educate and deploy innovative technology products and integrated solutions for World Wide Technology (WWT) customers, partners and employees around the globe.

Using the latest data center, collaboration, security and networking technology, WWT engineers simplify the complex by designing and integrating systems to solve business and technical challenges facing large public and private organizations.

KEY FEATURES

- $50M in technology infrastructure
- More than 100 racks of equipment
- More than 50 integrated systems demonstrations
- Hands-on Solution Showcase Center
- 1.3 million sq. ft. of secure staging and integration space

OFFERINGS

- Proofs of concept
- Comparative analyses
- Reference architectures
- Early field trials
- Integrated systems demonstrations
- Product demonstrations
- Research notes

World Wide Technology, Inc.

EMC² Pivotal RSA VCE vmware

World Wide Technology (WWT) deployed the Enterprise Hybrid Cloud (EHC) reference architecture in our ATC Test Labs. This solution brief evaluates the EHC reference architecture's ability to allow IT teams to quickly deploy an on-premise hybrid cloud capable of delivering infrastructure as a service (IaaS) to their organization.

WWT PERFORMS THE FOLLOWING SERVICES IN OUR ATC TEST LABS

- **Lab Hosting** for multiple technologies, with options for dedicated self-service or WWT-attended engagement
- **Verification** of capabilities based on execution of test plans, method of procedure and regression analysis, in accordance with formal software development lifecycle ownership methodology
- **Quantification** of product and system capabilities using performance and scale characterization
- **Certification** of products and systems according to established passing grade measurement
- **Interoperability** testing to determine functionality based on compatibility and protocol compliance

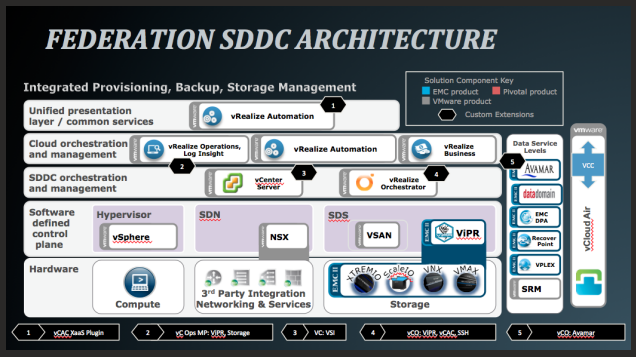
ENTERPRISE HYBRID CLOUD

EHC SOLUTIONS – BETTER TOGETHER

Research, develop and validate leading-edge solutions to deliver superior, integrated solution stacks across EMC, VMware, Pivotal and RSA

This engagement sought to verify the EHC reference architecture's capabilities, and incorporated the following key solution components:

- EMC ViPR™ software-defined storage platform
- EMC VNX® and/or EMC Symmetrix® VMAX® storage platforms
- EMC Avamar® and EMC Data Domain® backup and recovery solutions
- EMC and VMware integrated workflows
- VMware vCloud Suite
- VMware NSX virtual networking technologies
- VMware vRealize Log Insight
- VMware vRealize Business



USE CASE 1 • AUTOMATION AND SELF SERVICE PROVISIONING

Verify ability to rapidly deploy and provision business-relevant cloud services across a hybrid cloud and physical infrastructure, as well as allow cloud users to request and manage their applications and compute resources within established operational policies.

FEATURES/FUNCTIONALITY	TEST CASE AND CONFIGURATION	TESTING PASS/SUCCESS
Provide cross-cloud storefront service governor that can provision workloads based on business and IT policies.	Product: vRealize Automation Service catalog with entitlements appropriate for specific business units	WWT verified
Deliver a user-appropriate catalog of IT services (self service portal)	Product: vRealize Automation for building tenants, catalogs and provisions,	WWT verified
Enable resources to be allocated for use by a specific group and ensure that those resources are inaccessible to other groups	Leverage tenants and entitlements to ensure catalog items are only visible to the groups that should see them	WWT verified
Define the amount and type of resources that a given service can receive either during initial provisioning or as part of any configuration changes	Configure blueprints to allow minimum and maximum values for assigned resources	WWT verified
Contain the automation policies that specify the process for building or reconfiguring compute resources.	Configuring blueprints for creating infrastructure components	WWT verified

USE CASE 2 • MULTITENANCY AND SECURE SEPARATION

Verify ability to enforce physical and virtual separation for multitenancy, to the level required by an administrator, such that the separation can encompass network, compute, and storage resources to ensure appropriate security and performance for each tenant.

FEATURES/FUNCTIONALITY	TEST CASE AND CONFIGURATION	TESTING PASS/SUCCESS
Enable implementation of virtual local area networks (VLANs) to enable isolation at Layer 2 in the Cloud Management Pod and where the solution intersects with the physical network	Validate configuration of appropriate VLANs within environment according to reference architecture	WWT verified
Use virtual extensible LAN (VXLAN) overlay networks to segment tenant and business group traffic flows	Configure VXLAN within environment to support isolated networks according to reference architecture	WWT verified
Demonstrate integration with firewalls functioning at the hypervisor level to protect virtualized applications and enabling security policy enforcement in a consistent fashion throughout the solution	Validate NSX firewalls properly deployed for isolation according to reference architecture	WWT verified

USE CASE 3 • WORKLOAD-OPTIMIZED STORAGE

Test EMC ViPR storage services integrated with VNX and VMAX, to verify the ability to provide software-defined storage policy-based management of block- and file-based virtual storage.

FEATURES/FUNCTIONALITY	TEST CASE AND CONFIGURATION	TESTING PASS/SUCCESS
Abstract storage configuration and present it as a single storage point	Configure physical assets for VNX and VMAX into ViPR and create virtual pools as a single virtual array	WWT verified
Allow storage administrator to maintain control of storage resources	Configure fabric managers and physical storage systems so ViPR can provision storage and manage zoning	WWT verified
Allow cloud administrators to automatically provision tiered storage resources into the cloud without disruption	Integrate vCO workflows for ViPR into vRealize Automation and configure as a service in the self-service catalog	WWT verified

USE CASE 4 • ELASTICITY AND SERVICE ASSURANCE

Verify the ability of vRA and EMC tools to allow administrators and end users to dynamically add resources as needed, based on their performance requirements.

FEATURES/FUNCTIONALITY	TEST CASE AND CONFIGURATION	TESTING PASS/SUCCESS
Enable infrastructure administrators to add storage, compute, and network resources to resource pools	Easily scalable in storage, compute and network tiers	WWT verified
Enable end users to expand the resources of their virtual machines to achieve service levels needed for application workloads	Test if users are able to modify VM resources	WWT verified
Allow cloud users to select from a range of service levels of compute, storage, and data protection for their applications to achieve the most efficient use of the resources within their hybrid cloud environment	Configure multiple tiers of services	WWT verified

USE CASE 5 • MONITORING AND RESOURCE MANAGEMENT

Verify the ability of VMware vRealize Operations (vROps) dashboards, alerts, and analytics, along with additional storage detail provided by EMC analytics management packs for ViPR, VNX, and VMAX, to automate monitoring capabilities and provide a comprehensive view of the cloud environment to enable smart decision making for resource provisioning and allocation.

FEATURES/FUNCTIONALITY	TEST CASE AND CONFIGURATION	TESTING PASS/SUCCESS
Use pre-built and configurable dashboards for real-time performance, capacity, and configuration management and abstract performance data to health, risk, and efficiency measurement	Leverage vROps for at-a-glance monitoring and forecasting of the environment	WWT verified
Integrate vROps with EMC ViPR Analytics to enable full end-to-end visibility of an entire infrastructure, from virtual machine to LUN	Installed ViPR adapter into vROps	WWT verified
Use vRealize Hyperic as an additional component of the vRealize Operations Suite to allow application-level monitoring of performance and availability	Provide specific application metrics in addition to the other metrics being collected	WWT verified
Use ViPR Analytics and EMC Storage Analytics (ESA) management packs through the vROps custom interface to enables administrators to quickly visualize the health of EMC ViPR virtual arrays as well as physical VMAX and VNX arrays	Monitor system performance of the ViPR controllers, virtual arrays, configured datastores and virtual pools through vROps	WWT verified
Explore capacity analytics in vROps to identify over-provisioned resources so they can be right-sized for the most efficient use of virtualized resources	Provided through the EMC ViPR – Capacity dashboard	WWT verified
Use EMC ViPR SRM, storage resource management software for comprehensive monitoring and reporting that helps IT organizations to visualize, analyze, and optimize their software-defined storage infrastructure	Leverage EMC ViPR SRM to provide a holistic view of the software-define storage environment	WWT verified
Accomplish centralized logging by configuring infrastructure components to forward their logs to VMware vRealize Log Insight, which then aggregates the logs from all the disparate sources for analytics and reporting	Forward all syslogs to a centralized server for easier analysis and searching	WWT verified

USE CASE 6 • METERING AND CHARGEBACK

Verify the ability of VMware vRealize Business to provide cloud administrators with metering and cost information across all business groups in the enterprise.

FEATURES/FUNCTIONALITY	TEST CASE AND CONFIGURATION	TESTING PASS/SUCCESS
Using vRealize Business' own reference database, enable vRealize Automation to automatically consume pre-established base prices and enables administrators to change them as required, thus eliminating the need to manually configure cost profiles in vRealize Automation and assign them to compute resources	Leverage vRealize Business to populate resource pricing and adjust any values as necessary	WWT verified
Explore vRealize Business integration into the vRealize Automation portal and cloud administrator and the effectiveness of the dashboard overview of the hybrid cloud infrastructure	Assign permissions to be able to use the vRealize Business tab within vRealize Automation and validate functionality	WWT verified