



**C&W** Business

cloud  
STACK  
COLLABORATION  
CONFERENCE  
MIAMI  
May 16-18, 2017



LIBERTY GLOBAL

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# WHO WE ARE

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LIBERTY GLOBAL®

# 24

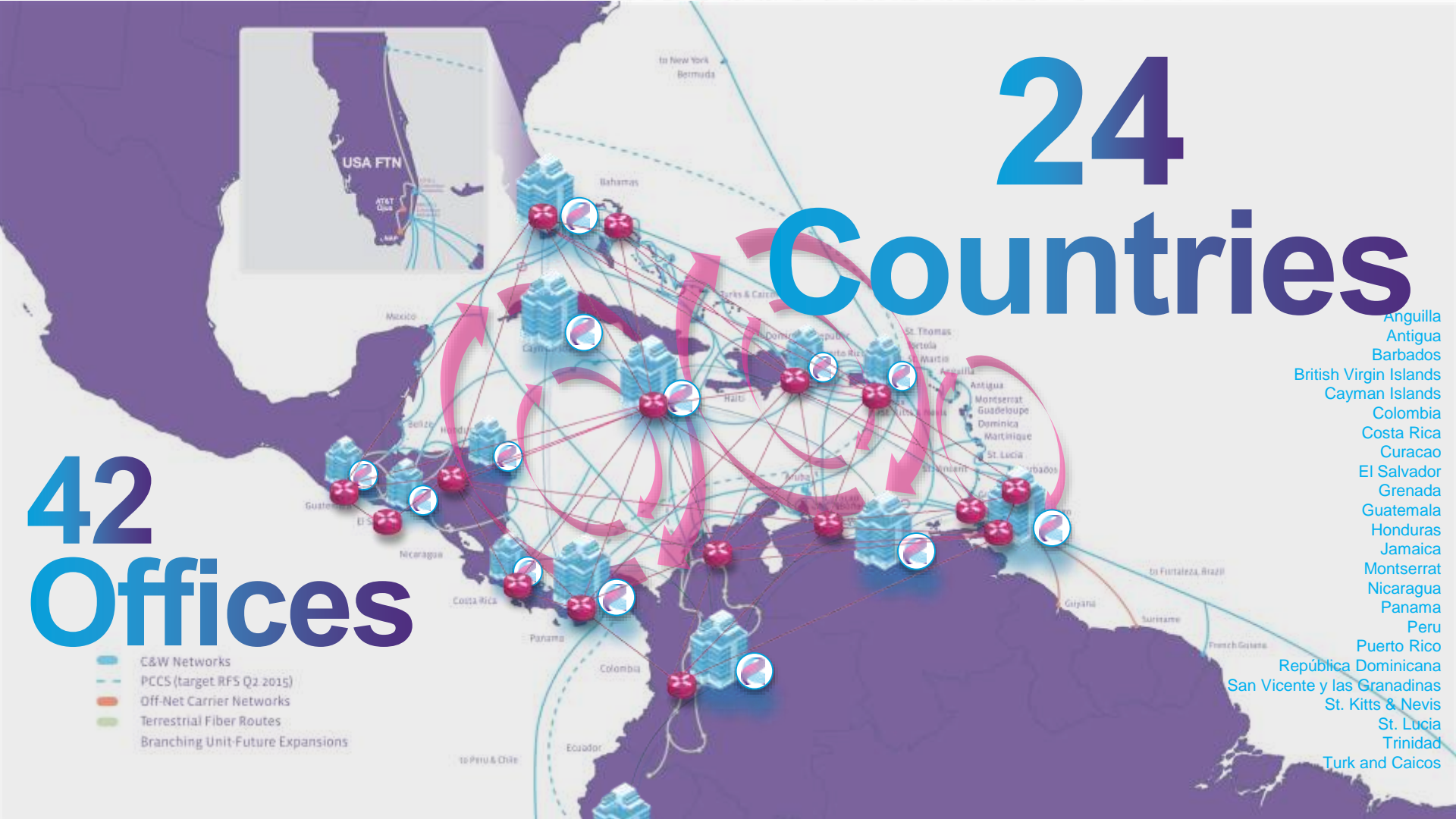
# Countries

# 42 Offices

- C&W Networks
- PCCS (target RF5 Q2 2015)
- Off-Net Carrier Networks
- Terrestrial Fiber Routes
- Branching Unit-Future Expansions



- Anguilla
- Antigua
- Barbados
- British Virgin Islands
- Cayman Islands
- Colombia
- Costa Rica
- Curacao
- El Salvador
- Grenada
- Guatemala
- Honduras
- Jamaica
- Montserrat
- Nicaragua
- Panama
- Peru
- Puerto Rico
- República Dominicana
- San Vicente y las Granadinas
- St. Kitts & Nevis
- St. Lucia
- Trinidad
- Turk and Caicos





## Our Network

42 countries, 54 cities

42,000 km of sub-sea fiber

22,300 km of terrestrial fiber

15,100 km of terrestrial coaxial

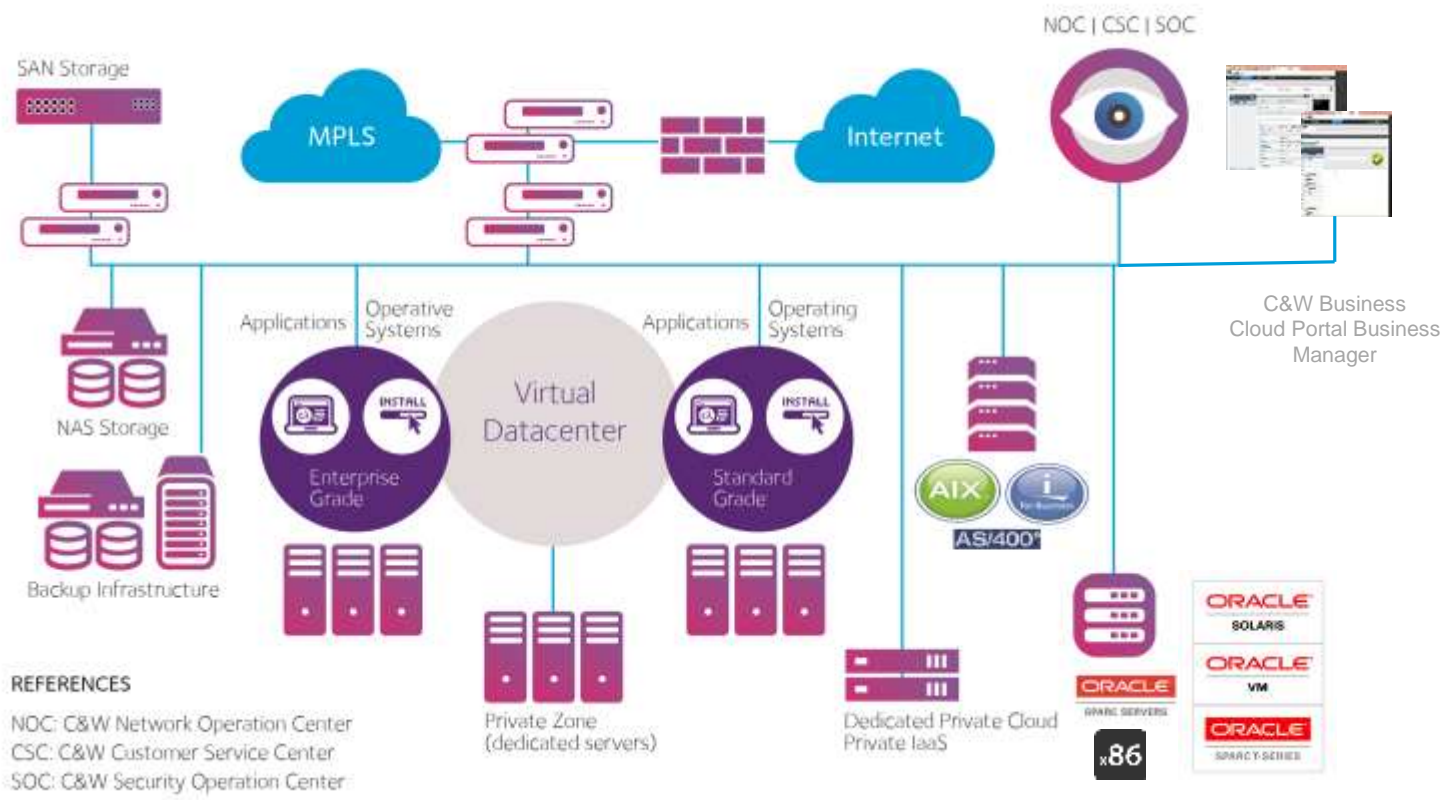
7 Data Centers

- > 7,500 employees
- > 6,000,000 customers
- > 125,000 Corporate clients
- > 3.8m with mobile services
- > 430000 TV, 650,000 broadband



Annual Sales  
US \$ 2.4 BILLION  
Capital Investment  
US \$ 1.5 BILLION  
2005-2012

# Cloud Infrastructure Architecture

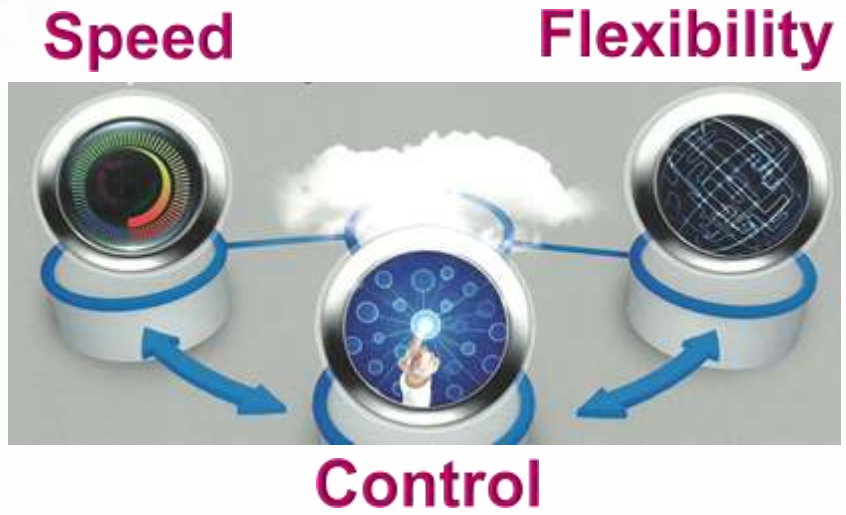
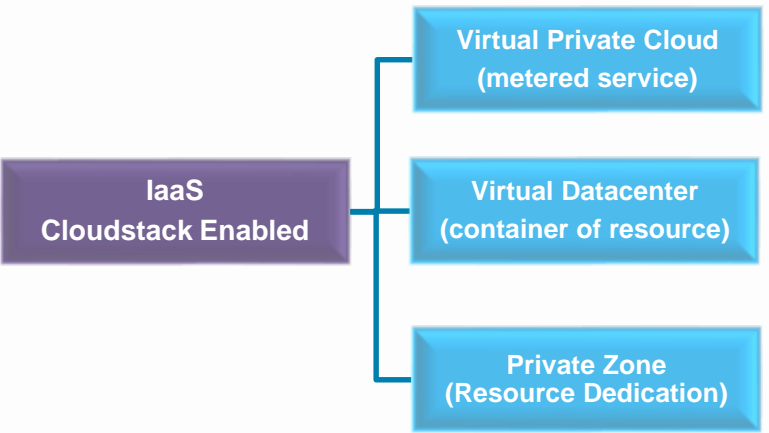


## REFERENCES

NOC: C&W Network Operation Center  
 CSC: C&W Customer Service Center  
 SOC: C&W Security Operation Center

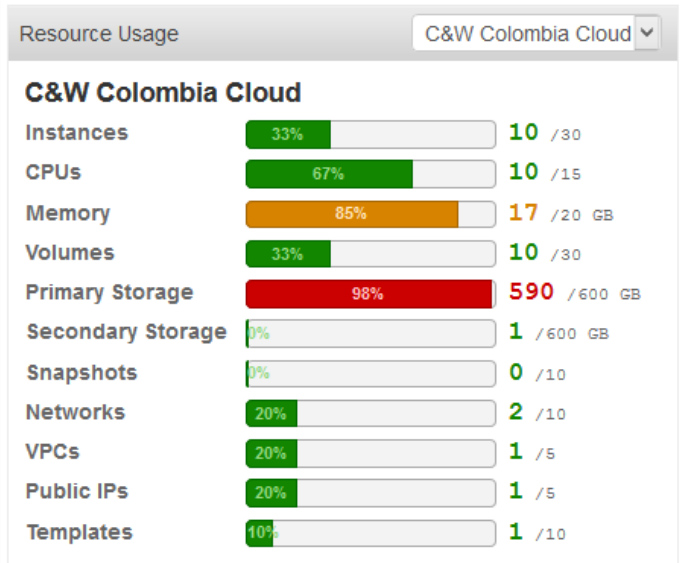
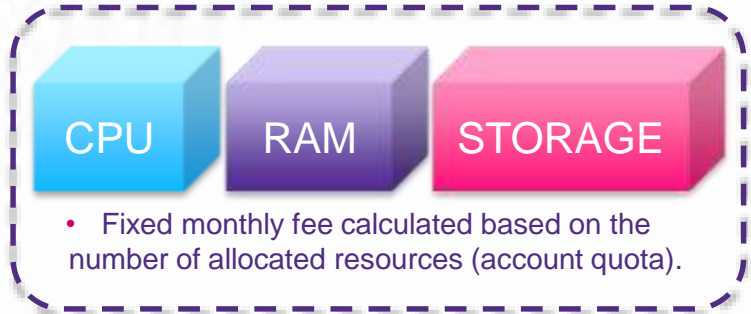
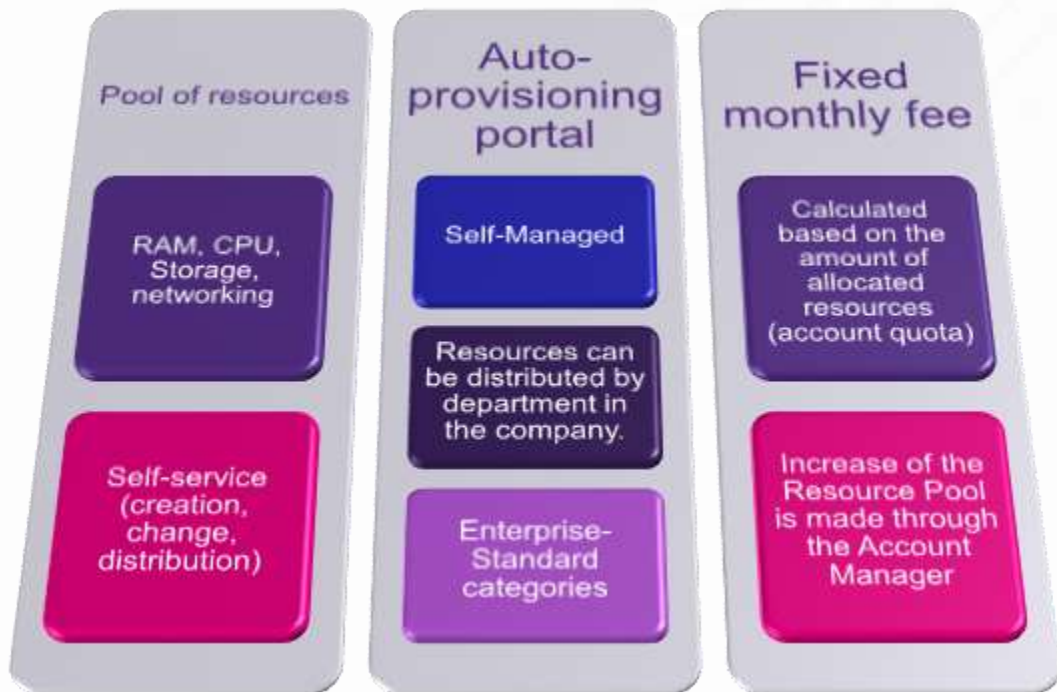
# ACS Enabled Cloud Infrastructure

- C&W Provide corporate IT self-managed cloud services based on different business models and powered by ACS and CPBM (Cloud Portal Business Manager)





# Model 1: C&W Virtual Datacenter (VDC)



# Other models

- VPC
  - VPC is the Metered service. Same service offering as the other models but no commitment.
  - Product Catalog implemented at CPBM
  - Credit limit associated to each account
  - Usage is reported to 3rd party Billing system
- Private Zone
  - Private Zone is provided through dedication of resources to an account. We achieve it through 'Explicit Dedication' at the Host level

The screenshot displays a service catalog with four rows, each representing a different service model. Each row contains an icon, a title, a description of resources, pricing information, and a 'Configure & Subscribe' button.

- Pay as you Go:** Features a meter icon. Pricing: 'Recurring minimum charge does not apply. You will be billed monthly for your actual usage based on utility rates.' Includes a 'One-time' charge field and a 'Configure & Subscribe' button.
- VM-ADV-SMALL-Linux:** Features a laptop icon with '1 CPU' and '2GB' labels. Description: '30 GB-Months of Root Volume, Unlimited Usage of VM-1CPU2GB, Unlimited Usage of ADV-1CPU'. Pricing: '\$ [input] /Month + \$0.00 One-time'. Includes a 'Configure & Subscribe' button.
- VM-ADV-MEDIUM-Linux:** Features a laptop icon with '2 CPU' and '4GB' labels. Description: '30 GB-Months of Root Volume, Unlimited Usage of VM-2CPU4GB, Unlimited Usage of ADV-2CPU'. Pricing: '\$ [input] /Month + [input] One-time'. Includes a 'Configure & Subscribe' button.
- VM-ADV-LARGE-Linux:** Features a laptop icon with '4 CPU' and '8GB' labels. Description: '30 GB-Months of Root Volume, Unlimited Usage of VM-4CPU8GB, Unlimited Usage of ADV-4CPU'. Pricing: '\$ [input] /Month + [input] One-time'. Includes a 'Configure & Subscribe' button.



## ■ Our Implementation Strategy

- We used Cloudops as our consultant for Cloud adoption as well as the project integrator and now for ongoing technical support

## ■ Architecture

- 6 ACS regions among 5 different countries – Connected to CPBM
- Each ACS region have a single advanced zone with one or more PODs and clusters
- Hypervisors: Vmware (Enterprise) and XenServer (Standard)
- Physical Hosts for Client VMs: UCS
- Primary Storage: Hitachi HUS
- Secondary Storage: Nexenta virtual storage over JBOD
- Management Servers in HA schema and with LB
- ACS access via SSO (Single-Sign-On) from CPBM platform. Clients do not have access to ACS user interface.



## Product Team\_Enterprise VDC

[All Services](#)[C&W Colombia Cloud](#)[C&W Panama Cloud](#)[C&W Curacao Cloud](#)[C&W Miami Cloud](#)[C&W Cayman Cloud](#)[Instances](#)[Volumes](#)[Snapshots](#)[IP Addresses](#)[Templates](#)[List All](#)[Launch VM](#)

No Filters Applied

**CW-CLD-GCONTR**  
10.20.60.10, 192.168.1.3



**CW-CLD-FILE02P**  
10.20.60.11, 192.168.1.5



**Host10**  
10.20.60.42



**ReplicaVMTest**  
192.168.1.4, 10.20.60.122



**server01**  
10.20.60.221



**Server3**  
10.20.60.31



**Server002**  
10.20.60.51



**Server001**

**Name**

CW-CLD-GCONTR

**IP Address**10.20.60.10 (Default)  
192.168.1.3**Status**

Running

[View Console](#)[Details](#)[Volumes](#)[Snapshots](#)[NICs](#)[Subscription](#)[Edit VM](#)**ID**

2c4f380b-d1f3-4444-a691-c9e708ea5403

**Display Name**

CW-CLD-GCONTR

**Group**

demo2

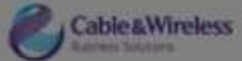
### ■ Networking and Security

- Advanced networking mode with isolated VLAN for each account
- Shared internet, dedicated link or MPLS connectivity - Private GW
- Virtual Router for the network and security services (Firewall, Load Balancer, Port Forwarding, VPN).
- Optional integration of external FW and LB via Private GWs or virtual appliances deployed inside ACS.

### ■ User Model

- CPBM account mapped to ACS domain
- ACS Resource limits used for container definition (VDC model)

- **Private / Public / Hybrid**
  - No self-subscription from Portal
  - Clients can run in shared or dedicated resources
  - Metered or flat rate
- **Integrations**
  - Billing via CPBM API
  - DR solution
- **Common Use Cases**
  - Enterprise cluster - VDC model for fixed workloads
  - DR environments



- Main
- Servers
- Infrastructure
- Service Health
- Metering Metrics
- Readiness Assessments
  - Detail
- Runbooks
- VNOC
- Contact
- Log Out

VERSION

2

Device List Network Data

Search Term: enter search

+ Add Single Device

Select

Role: Server Endpoint

Group: None

Device Name: FILE01-REP2

IP Address: 192.168.0.4

OS Family: Windows

OS Version: Windows 2008 R2 Standard 64bit

Type: Microsoft File Services

Infrastructure: C&W Curacao Cloud - Apache CloudStack

Minimum Service Offering: 1 CPU 1 GB RAM

Maximum Service Offering: 1 CPU 4 GB RAM

Location: please type city name...

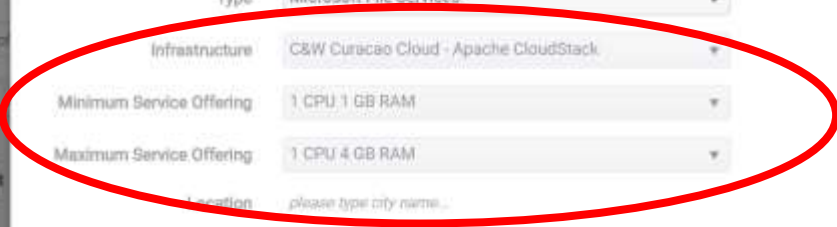
Application Version: optional

Network Roles: optional

Group:

Tag: add a new tag...  
select an existing tag...

Comments: please enter your comments here...



Contact Us

Add

View

View

View

View

View

1 - 6 (6)

## ■ Monitoring

- Tivoli – hypervisors and agent based – No multi-tenancy
- ZenOss – Cloudstack Zenpack – ACS API
  - ✓ Limited data for multi-tenant use

## ■ Client VM Backup

- Snapshot
  - ✓ Recurrent snapshot not space efficient for VMware
  - ✓ Doesn't cover all use cases
- Managed Backup – Commvault
  - ✓ Hypervisor level
  - ✓ Restore has to be done to an existing VM



- Stable and scalable – It works!
- Monitoring challenge for Service Provider – Publish available info in the Portal?
- Template management is challenging
- Seamless integration to open source Backup tool
- What is next?
  - ✓ Hybrid Cloud vision – CloudMC
  - ✓ Leverage existing integrations to 3rd party elements
  - ✓ Upgrade on the infra – new offerings

# THANK YOU

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