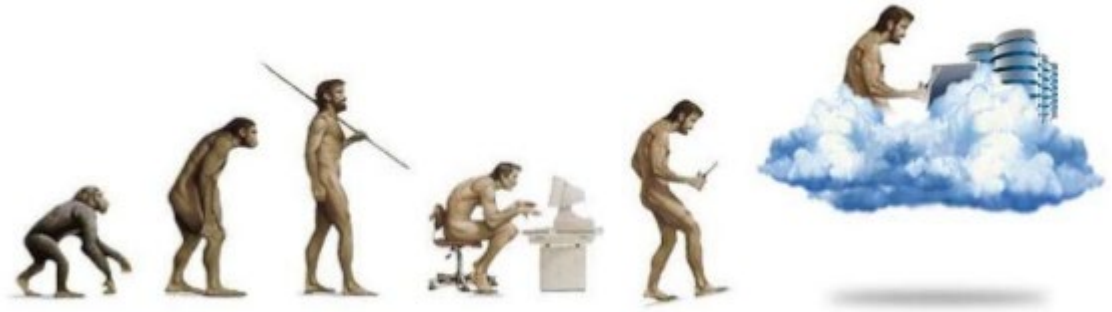
ANTHONY VAN DEN BOSSCHE

Lift and Shift to IaaS



Main topics

1. Discover & Assess systems
2. Migrate workloads to Azure
3. Manage & optimize

REALDOLMEN
a Gfi Group company

What is IaaS again?

- Infrastructure as a service
- Instant computing infrastructure
- Web based management
- One of 4 cloud services (SaaS, PaaS and serverless being the other kids on the block)

Why would I consider using IaaS?

- VM Scalability
- Pay only for what you use
- No acquisition and management of datacenter infrastructure
- Better security
- Innovate rapidly
- Focus on your core business
- Increase stability, reliability and supportability
- Opex instead of capex

On Premises	Infrastructure (as a Service)	Platform (as a Service)	Software (as a Service)	
Applications	Applications	Applications	Applications	
Data	Data	Data	Data	
Runtime	Runtime	Runtime	Runtime	
Middleware	Middleware	Middleware	Middleware	
O/S	O/S	O/S	O/S	You Manage
Virtualization	Virtualization	Virtualization	Virtualization	Vendor Manages
Servers	Servers	Servers	Servers	
Storage	Storage	Storage	Storage	
Networking	Networking	Networking	Networking	

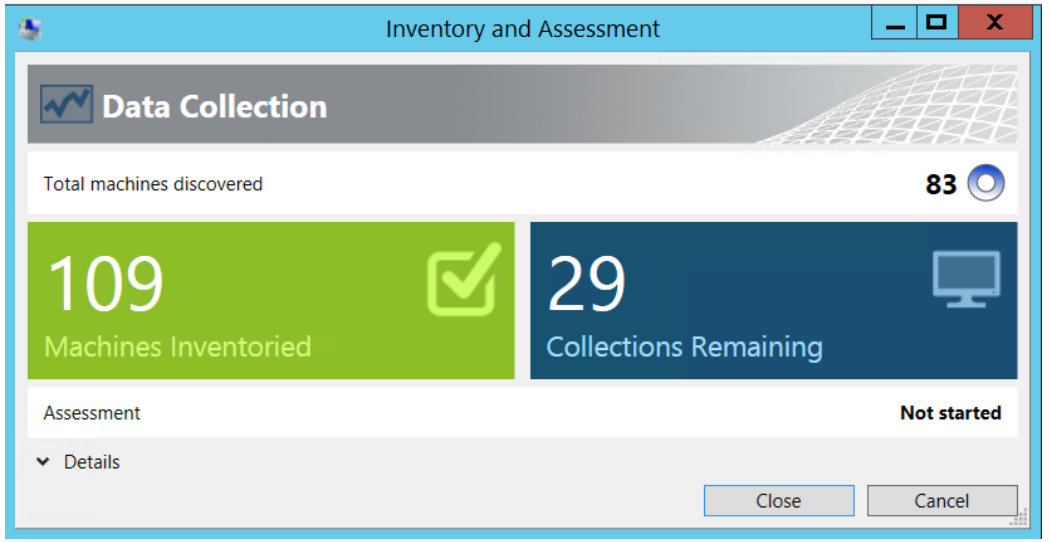
DISCOVER & ASSESS

Discover & assess target systems

- Have a clear line of sight in terms of
  - Which virtual machines are present in the environment
  - Different types of workloads
  - Virtualization utilization
  - Compute and storage needs
  - Azure costs
  - Dependencies between virtual machines
- Different toolsets exist that facilitate discovery & assessment
  - SCCM / Asset management
  - Custom scripting / Active Directory information / RVTools
  - Microsoft Assessment and Planning (MAP) toolkit
  - Azure Migrate

MICROSOFT ASSESSMENT AND PLANNING TOOLKIT

- Multipurpose toolkit to assess a variety of platforms
  - **Cloud readiness**: **Azure**/Office365
  - Database usage: SQL/Oracle
- Agentless, single executable install
- Multiple discovery methods
- Primarily uses WMI to capture data
- Provides performance metrics
- No cost estimation included
- No dependency mapping
- Extremely fast to setup (approx. 15 mins)
- Local database
- Microsoft's focus lies elsewhere…



Microsoft Azure VM Readiness

Steps to complete

Collect inventory data — 107 Machine(s), 28% Success on 22/03/2019 9:02

Options

Generate Microsoft Azure VM Readiness Report

Details

1

0

	A	B	C	D	E	F
1	**Assessment Results for Windows Servers**					
2	This report provides detail information on the Microsoft Windows Server machines that were evaluated to be migrated to a Microsoft Azure Virtual Machine.					
3						
4	**Machine Name**	**Operating System supported as Azure VM? (Windows Server 2008 R2 or later)**	**All SQL Server instances supported within a Azure VM? (SQL Server 2008 or later)**	**SQL Server Instances not supported within a Microsoft Azure VM**	**Machine Type**	**SQL Server Clustered?**
5	RE-ADAUDIT-01.Retail.local	No - Upgrade or Migrate to Windows Server 2008 R2 or later	Not Applicable		Virtual	No
6	RE-BCK-01.Retail.local	Yes	Yes		Physical	No
7	RE-COGNOS-01.Retail.local	Yes	Not Applicable		Virtual	No
8	RE-DA-01.Retail.local	No - Upgrade or Migrate to Windows Server 2008 R2 or later	Not Applicable		Virtual	No

0 Not Ready

Current Machine Utilization

This report provides details of the current utilization of machines in your network based on performance details collected earlier. All values are for the 95th percentile, except for disk space, for which the maximum utilization is shown.

Machine Name	Operating System	Machine Type	CPU	Cores	System Memory (MB)	Disk Size (GB)	IP Address	CPU Utilization (%	Memory Utilization (MB)	IOPS	Disk Space Utilization (GB)	Network Utilization-Out (
RE-ADAUDIT-01.Retail.local	Microsoft Windows Server 2016 Standard	Virtual	Intel(R) Xeon(R) CPU E5-2640 v2 @ 2.00GHz, 64	2	4096	59 29	10.0.0.92;fe80::fd1	1,65	1404,96	3,95	18,55	0
RE-BCK-01.Retail.local	Microsoft Windows Server 2012 R2 Standard	Physical	Intel(R) Xeon(R) CPU E5-2620 v3 @ 2.40GHz, 64 bit	24	16384	0 11177	10.0.0.68;fe80::e54c:8a73:2933:dd01	6,27	14195,76	193,76	8217,37	0,46
RE-COGNOS-01.Retail.local	Microsoft Windows Server 2012 R2 Datacenter	Virtual	Intel(R) Xeon(R) CPU E5-2620 v2 @ 2.10GHz, 64 bit	4	65536	499 250 59	10.0.0.80;fe80::f107:534e:29	3,4	36334,27	2,31	260,52	0
RE-DA-01.Retail.local	Microsoft Windows Server 2016 Standard	Virtual	Intel(R) Xeon(R) CPU E5-2640 v2 @ 2.00GHz, 64	4	2048	59	10.0.0.171;fe80::e	2,65	1467,69	10,69	14,3	0
RE-DC-02.Retail.local	Microsoft Windows Server 2012 R2 Datacenter	Virtual	Intel(R) Xeon(R) CPU E5-2640 v2 @ 2.00GHz, 64	1	4096	59	10.0.0.85;fe80::54	5,57	3034,14	3,4	25,85	0

Virtual Machine Sizing Results

This report provides machine level sizing information and estimated monthly resource usage for each machine in your environment after it has been migrated to a Microsoft Azure Virtual

Machine Name	Operating System	Machine Type	Azure VM Size	Est. Monthly	Est. Monthly Network Use-	Est. Monthly Storage Use	VM CPU Utilization (%)	VM Memory	VM Disk I/O	VM Netwo	VM Network Utilization-I	Data Disks
RE-ADAUDIT-01.Retail.local	Microsoft Windows Server 2016 Standard	Virtual	B1ms	11520	4,26	18,55	11,77	1404,96	3,95	0	0,04	1
RE-BCK-01.Retail.local	Microsoft Windows Server 2012 R2 Standard	Physical	B4ms	11520	583,2	8217,37	80,26	14195,76	193,76	0,46	117,06	1
RE-COGNOS-01.Retail.local	Microsoft Windows Server 2012 R2 Datacenter	Virtual	A8m_v2	1440	0,24	260,52	5,59	36334,27	2,31	0	0	2
RE-DA-01.Retail.local	Microsoft Windows Server 2016 Standard	Virtual	B1ms	11520	0,63	14,3	34,38	1467,69	10,69	0	0,01	0
RE-DC-02.Retail.local	Microsoft Windows Server 2012 R2 Datacenter	Virtual	B2s	11520	3,04	25,85	10,88	3034,14	3,4	0	0,01	0

Assessment Results for SQL Server Database Instances

This worksheet provides details on each Microsoft SQL Server database instance

Computer Name	SQL Server Instance Name	SQL Server Product Name	SQL Server Version	SQL Server Service Pack	SQL Server Edition	Clustered?	SQ L	SQL Service State	SQL Service Start Mode	Current Operating System	Number of Processors
RE-BCK-01.Retail.local	MSSQL$SQLEXPRESS	Microsoft SQL Server 2014	12.1.4100.1	SP1	Express	No		Running	Auto	Microsoft Windows Server 2012 R2 Standard	2
RE-SQL-02.Retail.local	MSSQL$SQL01	Microsoft SQL Server 2008 R2	10.53.6000.34	SP3	Standard	No		Running	Auto	Microsoft Windows Server 2012 R2 Datacenter	1
RE-SQL-02.Retail.local	MSSQL$SQL02	Microsoft SQL Server 2012	11.3.6020.0	SP3	Standard	No		Running	Auto	Microsoft Windows Server 2012 R2 Datacenter	1

SQL Server Components

SQL Server Database Summary

Listing of all databases discovered on each database server instance with operational details such as size of the database, last backup time, owner name.

Server Name	SQL Server Database Engine	SQL Server Product Name	Database Name	Database Size (MB)	Data Files Size (MB)	Log Files Size (M	Log Files Used Siz	Log Files Used	SQL Connection	Compatibility	Status
RE-BCK-01.Retail.local	SQLEXPRESS	Microsoft SQL Server 2014	master	7.63 MB					Success	120	Status=ONLINE,
RE-BCK-01.Retail.local	SQLEXPRESS	Microsoft SQL Server 2014	model	5.44 MB					Success	120	Status=ONLINE,
RE-BCK-01.Retail.local	SQLEXPRESS	Microsoft SQL Server 2014	msdb	43.31 MB					Success	120	Status=ONLINE,
RE-BCK-01.Retail.local	SQLEXPRESS	Microsoft SQL Server 2014	ReportServer$SQLEXPRESS	10.88 MB					Success	120	Status=ONLINE,
RE-BCK-01.Retail.local	SQLEXPRESS	Microsoft SQL Server 2014	ReportServer$SQLEXPRESSTe	5.75 MB					Success	120	Status=ONLINE,
RE-BCK-01.Retail.local	SQLEXPRESS	Microsoft SQL Server 2014	tempdb	4.94 MB					Success	120	Status=ONLINE,
RE-SQL-02.Retail.local	SQL01	Microsoft SQL Server 2008	AERIUM	49.73 MB	49,1875	0,539	0,332	61	Success	90	Status=ONLINE,
RE-SQL-02.Retail.local	SQL01	Microsoft SQL Server 2008	AFRIT 5 PRODUCTIE	50.24 MB	49,75	0,4843	0,4101	84	Success	80	Status=ONLINE,
RE-SQL-02.Retail.local	SQL01	Microsoft SQL Server 2008	ARLON	31.06 MB	30,25	0,5546	0,5156	92	Success	100	Status=ONLINE,
RE-SQL-02.Retail.local	SQL01	Microsoft SQL Server 2008	ASVERCO	48.36 MB	47,8125	0,539	0,4101	76	Success	90	Status=ONLINE,
RE-SQL-02.Retail.local	SQL01	Microsoft SQL Server 2008 R2	BELGIUM RETAIL 1	51.73 MB	51,1875	0,539	0,2421	44	Success	90	Status=ONLINE, Updateability=READ_WRITE, UserAccess=MULTI_USER, Recovery=FULL, Version=661,

AZURE TOTAL COST OF OWNERSHIP CALCULATOR

- Web based tool to estimate cost savings when moving to Microsoft Azure
- Input information about your organization
  - Servers: amount of physicals/virtuals, compute allocated and OS
  - Databases: type, amount, compute allocated, OS, storage (HDD/SSD for data files/backup, IOPS)
  - Storage: disk type, capacity, backup, archive iops
  - Networking: outbound bandwidth (egress)
- Adjust assumptions
  - Electricity costs
  - Datacenter costs
  - …

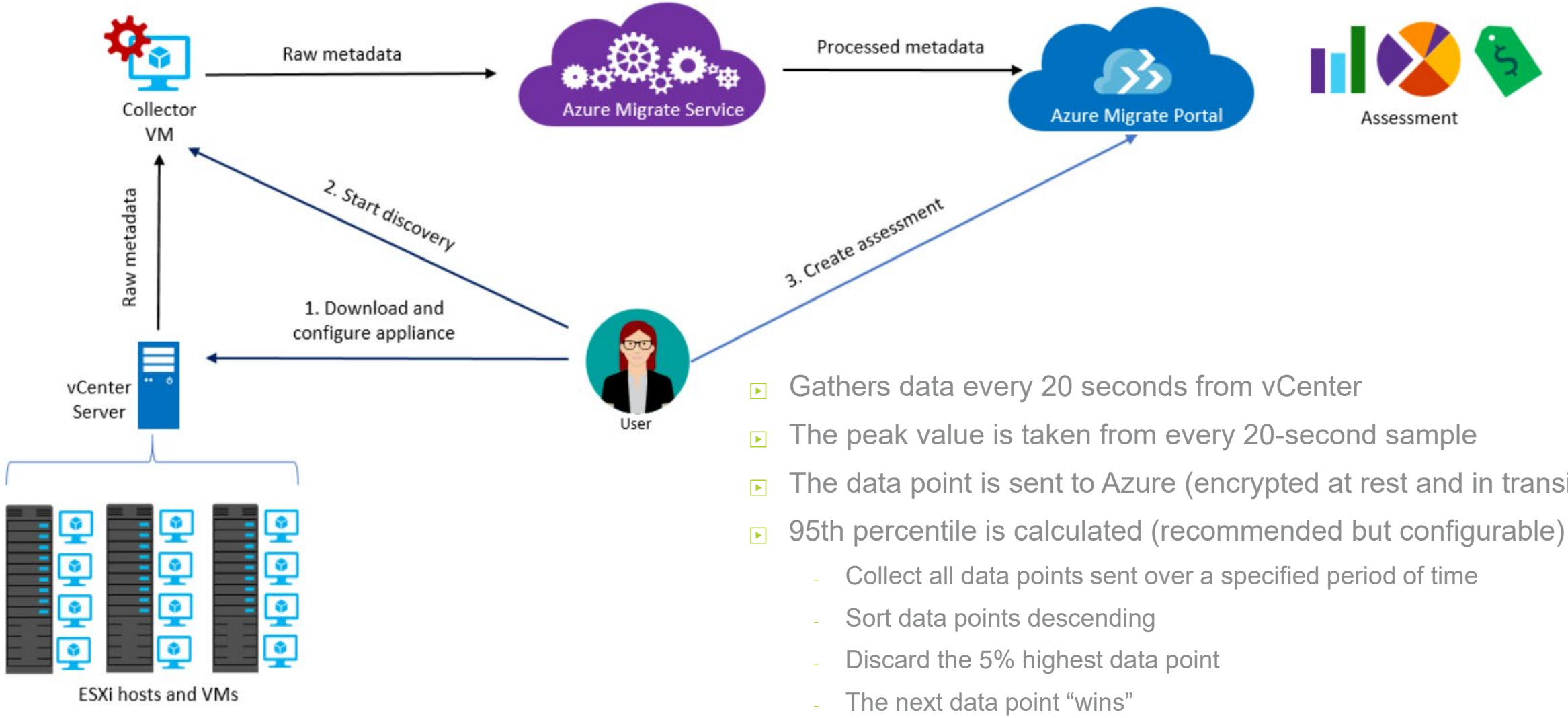

DEMO TCO CALCULATOR

Azure Migrate – What can it do?

- Assess Azure readiness:
  - Assess whether your on-premises machines are suitable for running in Azure.
- Provide size recommendations:
  - Right-sizing VM's based on performance assessment
- Estimate monthly costs:
  - Get estimated costs for running on-premises machines in Azure.
- Dependency mapping:
  - Visualize dependencies of on-premises machines

Azure Migrate – Limitations

- Only VMWare – (Hyper-V in preview)
- Physical servers cannot be discovered and assessed



- Gathers data every 20 seconds from vCenter
- The peak value is taken from every 20-second sample
- The data point is sent to Azure (encrypted at rest and in transit!)
- 95th percentile is calculated (recommended but configurable)
  - Collect all data points sent over a specified period of time
  - Sort data points descending
  - Discard the 5% highest data point
  - The next data point “wins”

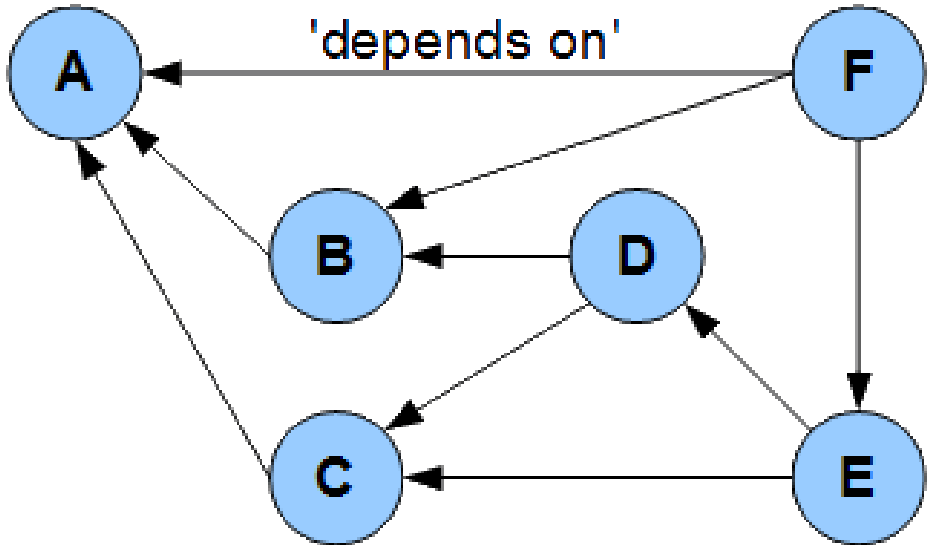
AZURE MIGRATE – GOOD TO KNOW

- Multiple vCenters can be discovered by a single collector appliance
- On-prem compute changes are picked up
- Configure AV exclusions
- Barely a performance impact on VMWare
  - No need to change VMWare's statistics level
- A project with 10 machines requires 50MB of upload per day
- Discover up to 1500 VM's in a single project
- No EA based cost estimation, workaround with discount percentage
- Dependency visualization cannot be exported
- Dependency visualization of up to 10 servers in 1 group
- Azure Migrate is free, as is Service Map!

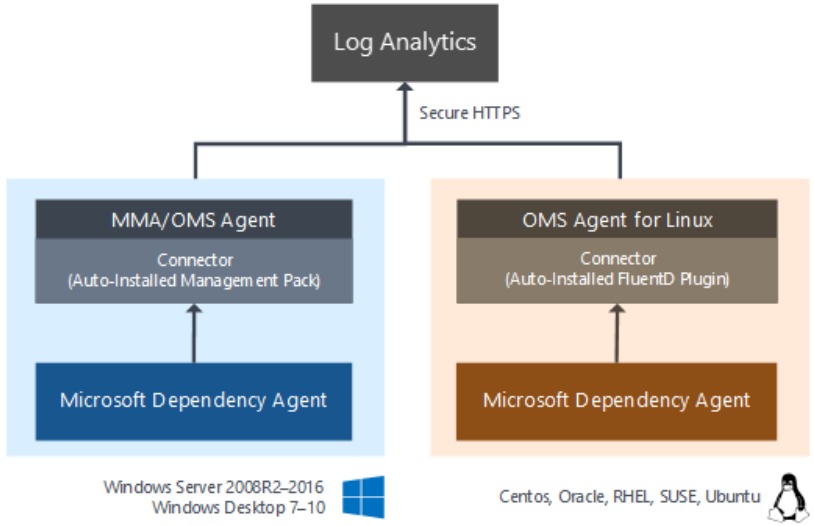
DEMO AZURE MIGRATE – DISCOVERY AND ASSESSMENT

AZURE MIGRATE – DEPENDENCY VISUALIZATION WITH SERVICE MAP

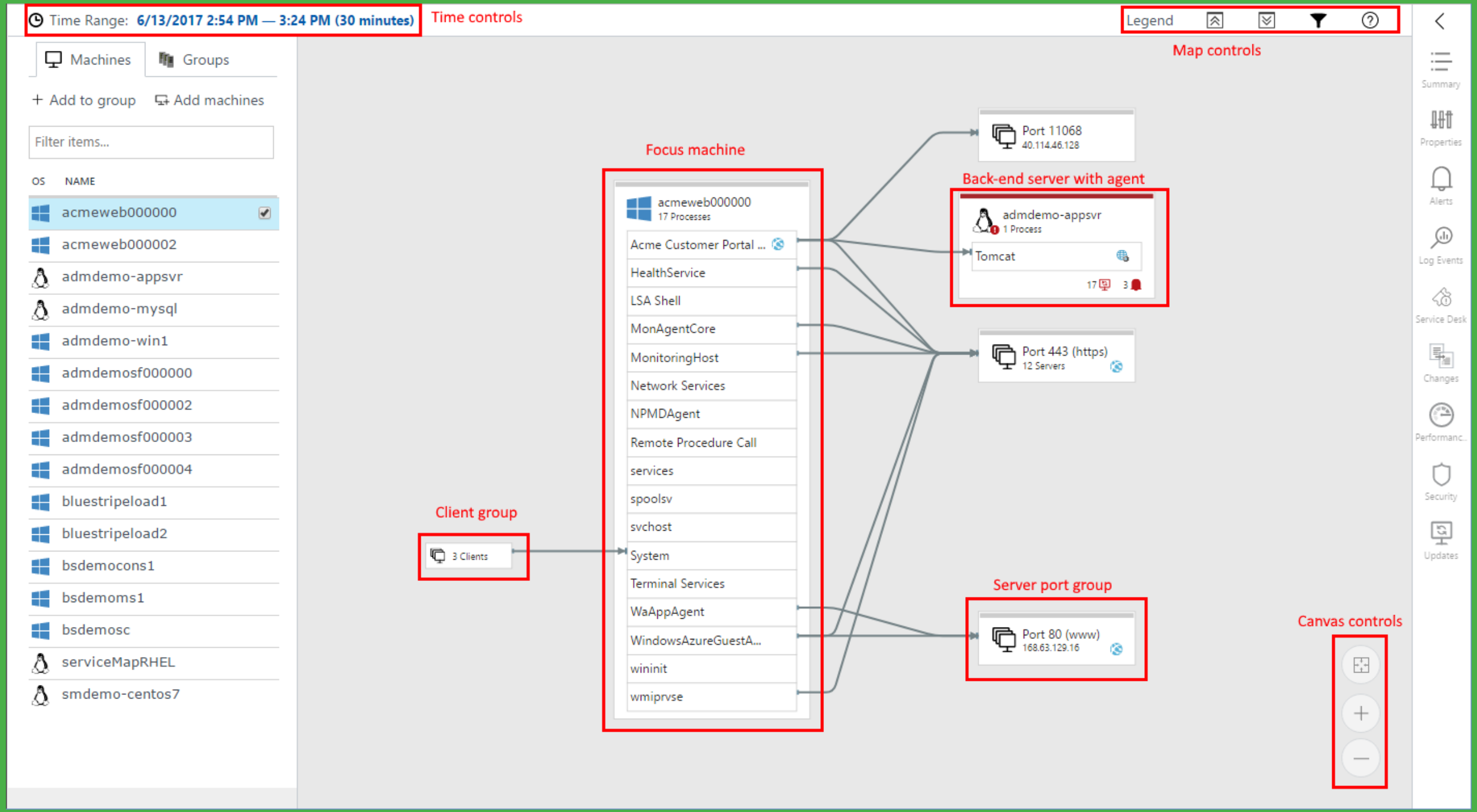
- Discovers various application components and maps dependancies
- Living topology diagram, shows last 30 minutes of dependency information
- Migrate interdependent machines together
- Other use cases include
  - Identify misconfigurations
  - Identify stale / unused applications

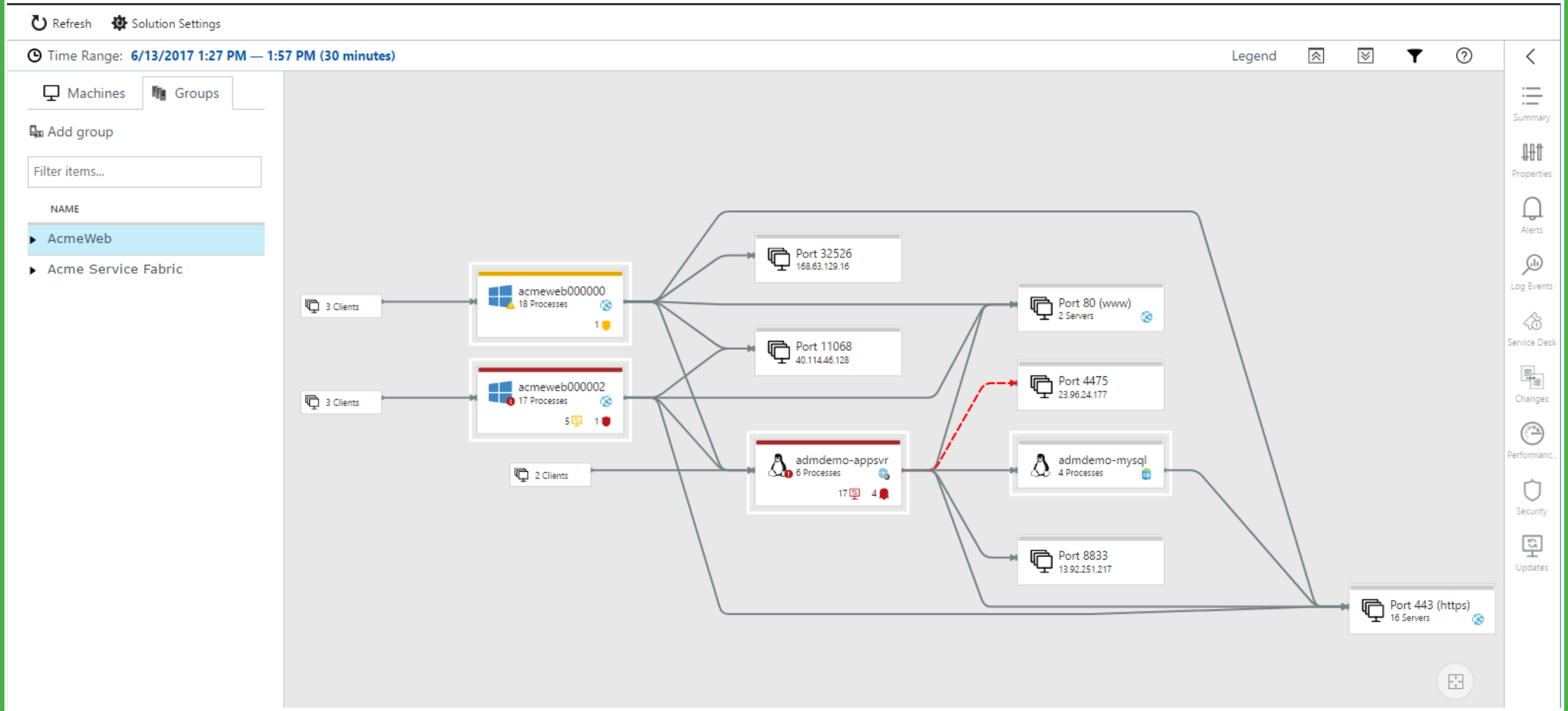


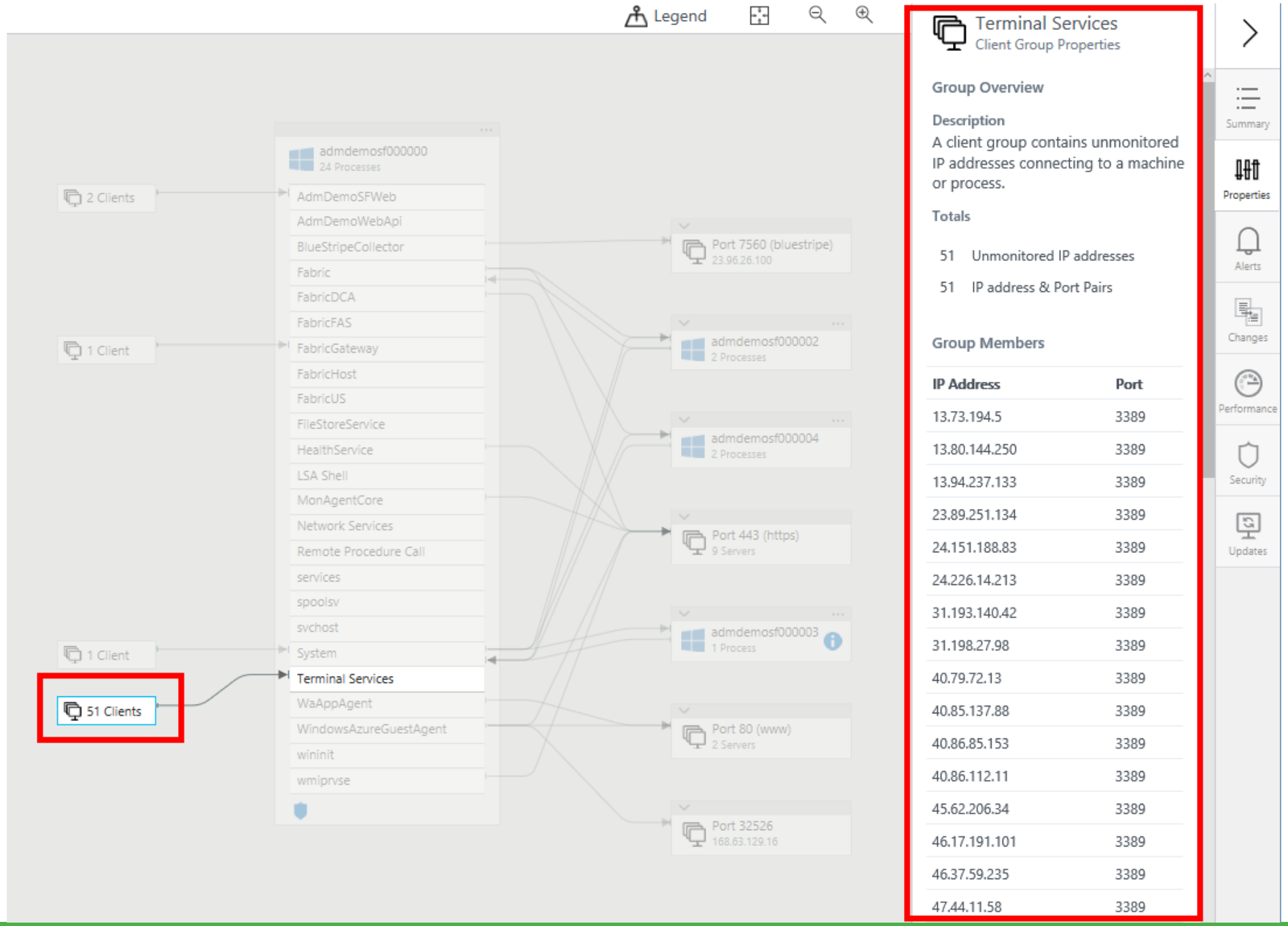
AZURE MIGRATE – SERVICE MAP REQUIREMENTS

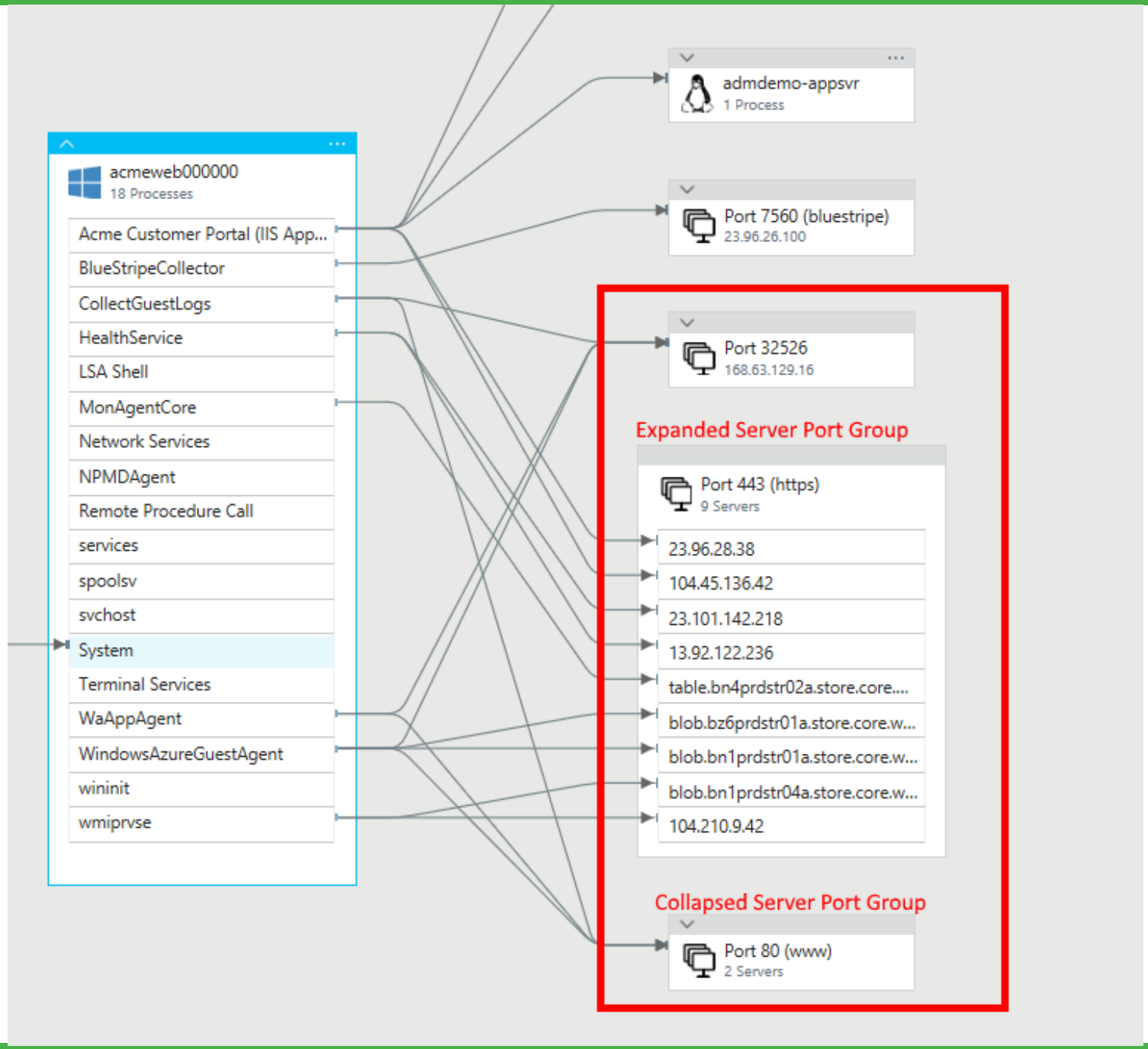


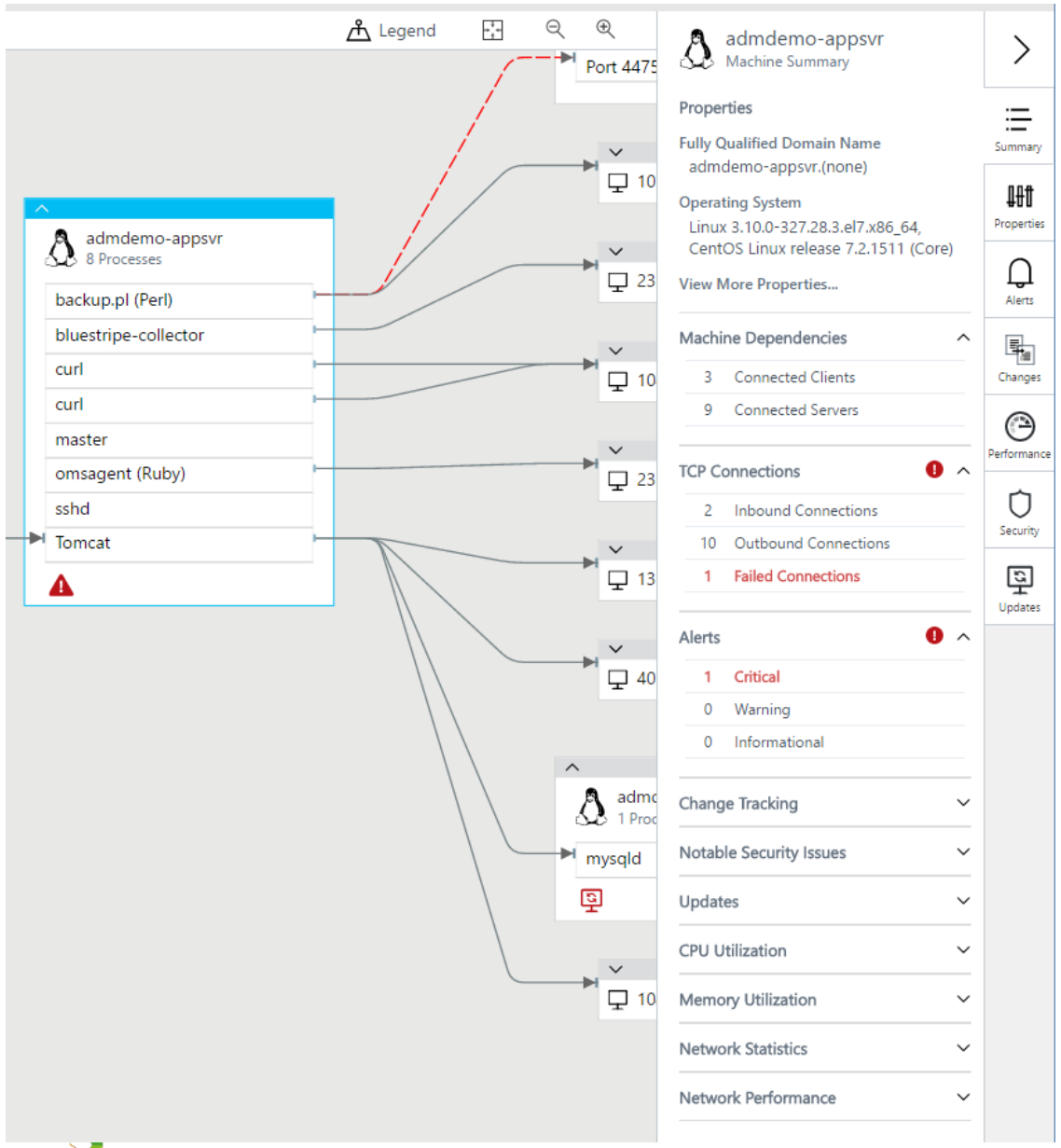
- Azure subscription, duh!
- A Log Analytics workspace
- Installation of 2 agents
  - Microsoft Monitoring Agent (MMA)
    - Gathers and sends data to Log Analytics
    - Automated deploy through Azure Automation Desired State Configuration / Powershell / SCCM / …
  - dependency agent
    - Gathers dependency information
    - Forwards information to the MMA agent for transmission
    - Automated deploy through Azure Automation Desired State Configuration / Powershell / SCCM / …
- Windows 7/2008R2 and higher are supported (variety of Linux distro's supported as well)

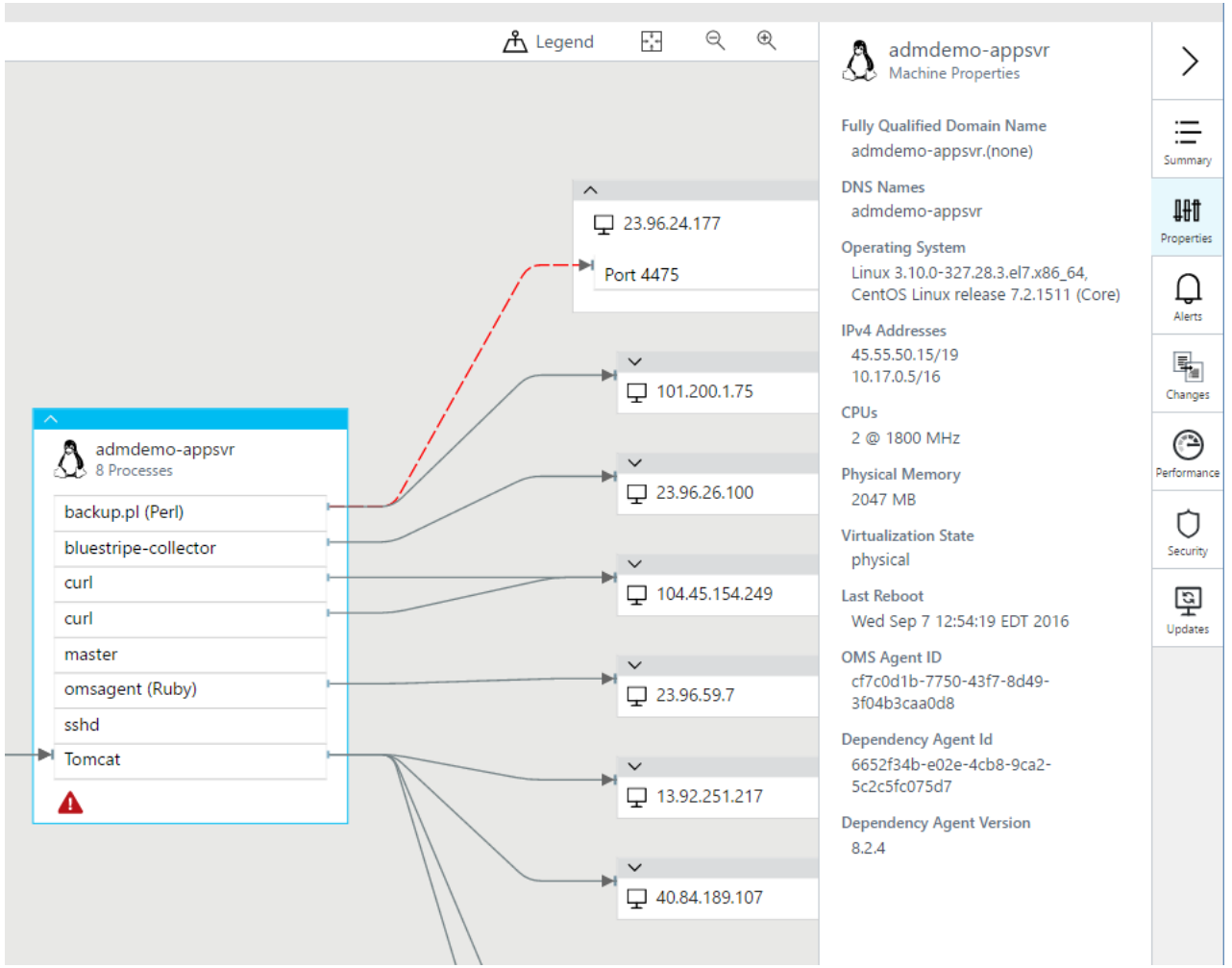

Time Range: 6/13/2017 2:54 PM — 3:24 PM (30 minutes)
Time controls
Legend
Map controls
Machines
Groups
+ Add to group
Add machines
Filter items...
OS
NAME
acmeweb000000
acmeweb000002
admdemo-appsvr
admdemo-mysql
admdemo-win1
admdemosf000000
admdemosf000002
admdemosf000003
admdemosf000004
bluestripeload1
bluestripeload2
bsdemocons1
bsdemoms1
bsdemosc
serviceMapRHEL
smdemo-centos7
Focus machine
acmeweb000000
17 Processes
Acme Customer Portal ...
HealthService
LSA Shell
MonAgentCore
MonitoringHost
Network Services
NPMDAgent
Remote Procedure Call
services
spoolsv
svchost
System
Terminal Services
WaAppAgent
WindowsAzureGuestA...
wininit
wmiprvse
Client group
3 Clients
Port 11068
40.114.46.128
Back-end server with agent
admdemo-appsvr
1 Process
Tomcat
17
3
Port 443 (https)
12 Servers
Server port group
Port 80 (www)
168.63.129.16
Canvas controls
Summary
Properties
Alerts
Log Events
Service Desk
Changes
Performanc...
Security
Updates


Refresh
Solution Settings
Time Range: 6/13/2017 1:27 PM — 1:57 PM (30 minutes)
Legend
Machines
Groups
Add group
Filter items...
NAME
AcmeWeb
Acme Service Fabric
3 Clients
3 Clients
2 Clients
acmeweb000000
18 Processes
acmeweb000002
17 Processes
admdemo-appsvr
6 Processes
Port 32526
168.63.129.16
Port 11068
40.114.46.128
Port 80 (www)
2 Servers
Port 4475
23.96.24.177
admdemo-mysql
4 Processes
Port 8833
13.92.251.217
Port 443 (https)
16 Servers
Summary
Properties
Alerts
Log Events
Service Desk
Changes
Performanc...
Security
Updates


Legend
admdemosf000000
24 Processes
2 Clients
AdmDemoSFWeb
AdmDemoWebApi
BlueStripeCollector
Fabric
FabricDCA
FabricFAS
1 Client
FabricGateway
FabricHost
FabricUS
FileStoreService
HealthService
LSA Shell
MonAgentCore
Network Services
Remote Procedure Call
services
spoolsv
svchost
1 Client
System
Terminal Services
51 Clients
WaAppAgent
WindowsAzureGuestAgent
wininit
wmiprvse
Port 7560 (bluestripe)
23.96.26.100
admdemosf000002
2 Processes
admdemosf000004
2 Processes
Port 443 (https)
9 Servers
admdemosf000003
1 Process
Port 80 (www)
2 Servers
Port 32526
168.63.129.16
Terminal Services
Client Group Properties
Group Overview
Description
A client group contains unmonitored IP addresses connecting to a machine or process.
Totals
51 Unmonitored IP addresses
51 IP address & Port Pairs
Group Members
IP Address
Port
13.73.194.5 3389
13.80.144.250 3389
13.94.237.133 3389
23.89.251.134 3389
24.151.188.83 3389
24.226.14.213 3389
31.193.140.42 3389
31.198.27.98 3389
40.79.72.13 3389
40.85.137.88 3389
40.86.85.153 3389
40.86.112.11 3389
45.62.206.34 3389
46.17.191.101 3389
46.37.59.235 3389
47.44.11.58 3389
Summary
Properties
Alerts
Changes
Performance
Security
Updates


admdemo-appsvr
1 Process
acmeweb000000
18 Processes
Acme Customer Portal (IIS App...
BlueStripeCollector
CollectGuestLogs
HealthService
LSA Shell
MonAgentCore
Network Services
NPMDAgent
Remote Procedure Call
services
spoolsv
svchost
System
Terminal Services
WaAppAgent
WindowsAzureGuestAgent
wininit
wmiprvse
Port 7560 (bluestripe)
23.96.26.100
Port 32526
168.63.129.16
Expanded Server Port Group
Port 443 (https)
9 Servers
23.96.28.38
104.45.136.42
23.101.142.218
13.92.122.236
table.bn4prdstr02a.store.core....
blob.bz6prdstr01a.store.core.w...
blob.bn1prdstr01a.store.core.w...
blob.bn1prdstr04a.store.core.w...
104.210.9.42
Collapsed Server Port Group
Port 80 (www)
2 Servers


Legend
admdemo-appsvr
8 Processes
backup.pl (Perl)
bluestripe-collector
curl
curl
master
omsagent (Ruby)
sshd
Tomcat
Port 4475
mysqld
admdemo-appsvr
Machine Summary
Properties
Fully Qualified Domain Name
admdemo-appsvr.(none)
Operating System
Linux 3.10.0-327.28.3.el7.x86_64,
CentOS Linux release 7.2.1511 (Core)
View More Properties...
Machine Dependencies
3 Connected Clients
9 Connected Servers
TCP Connections
2 Inbound Connections
10 Outbound Connections
1 Failed Connections
Alerts
1 Critical
0 Warning
0 Informational
Change Tracking
Notable Security Issues
Updates
CPU Utilization
Memory Utilization
Network Statistics
Network Performance
Summary
Properties
Alerts
Changes
Performance
Security
Updates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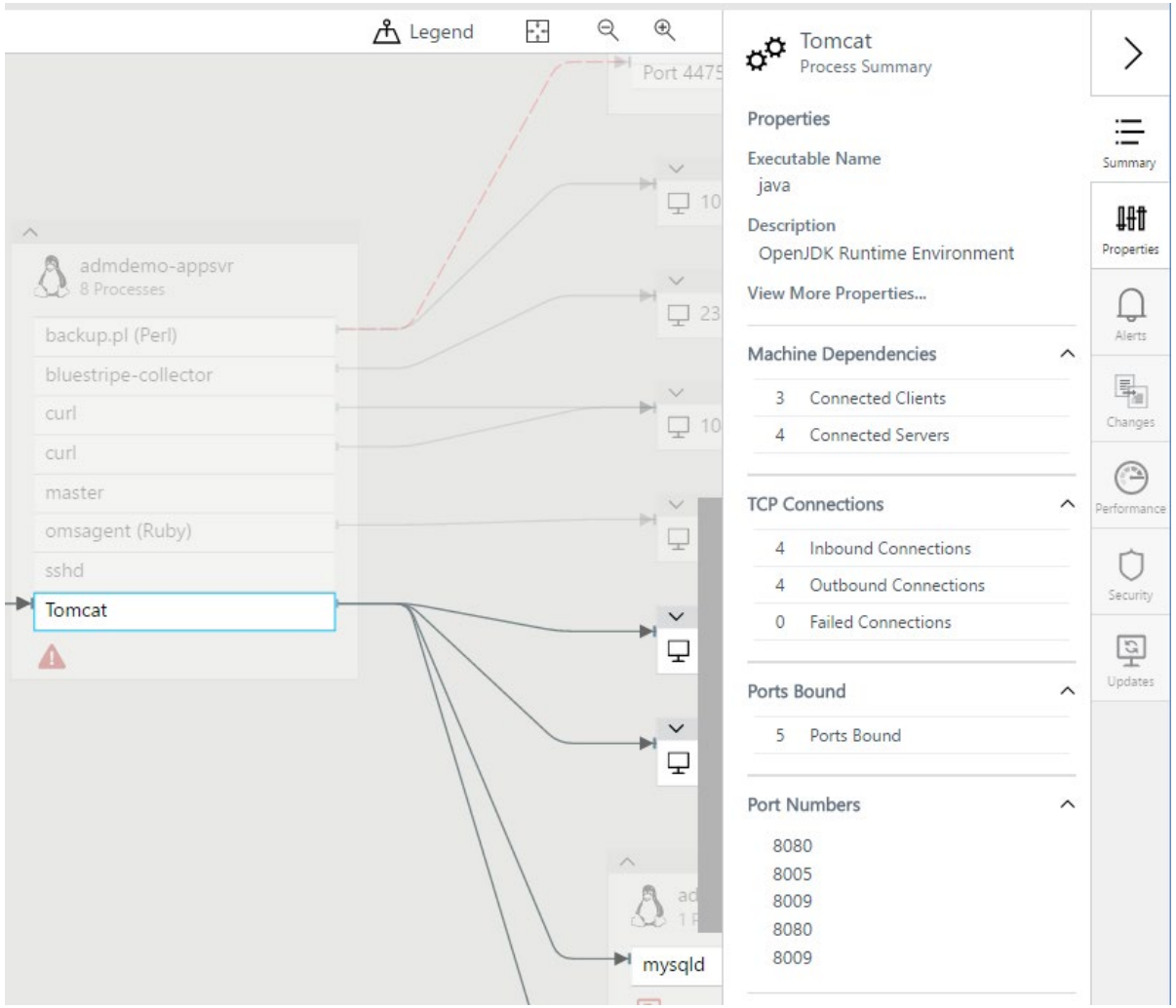
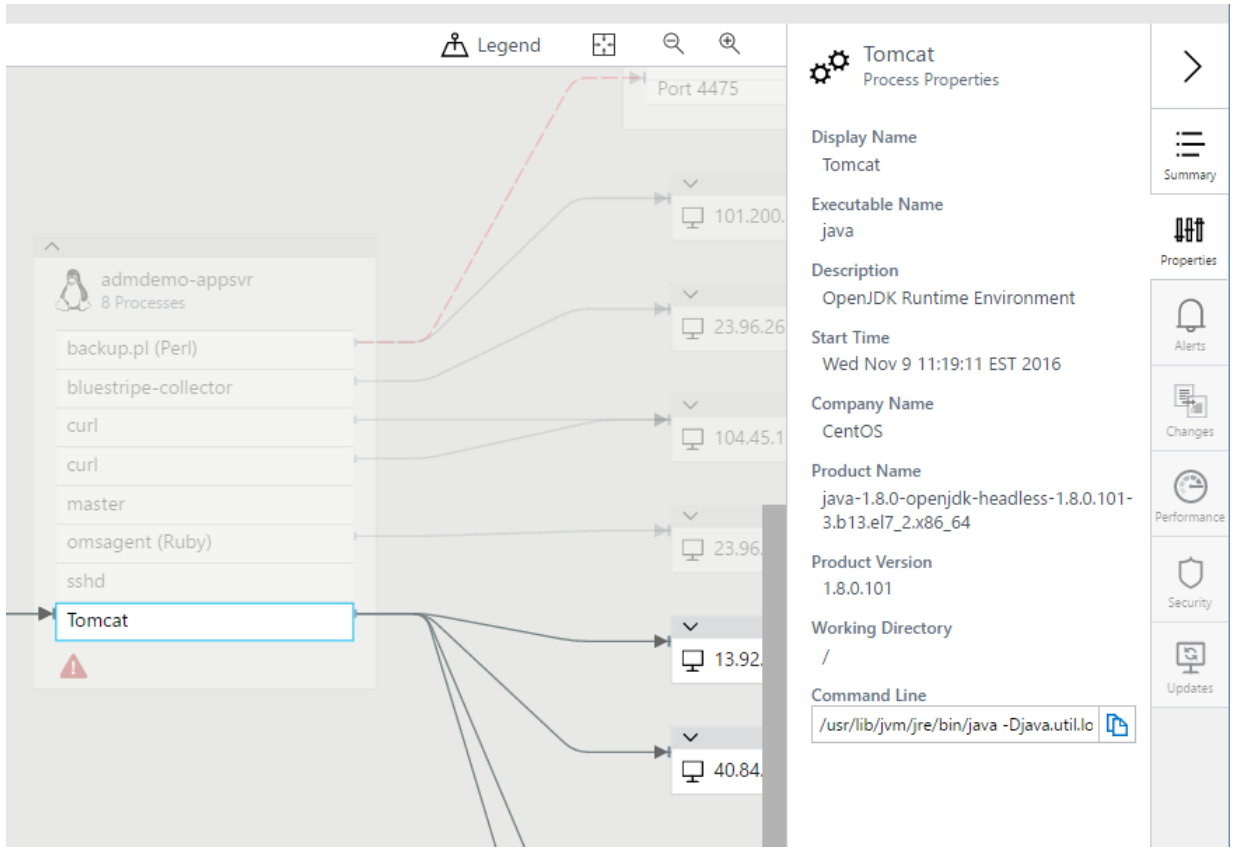
23.96.24.177
Port 4475
101.200.1.75
23.96.26.100
104.45.154.249
23.96.59.7
13.92.251.217
40.84.189.107
admdemo-appsvr
Machine Properties
Fully Qualified Domain Name
admdemo-appsvr.(none)
DNS Names
admdemo-appsvr
Operating System
Linux 3.10.0-327.28.3.el7.x86_64,
CentOS Linux release 7.2.1511 (Core)
IPv4 Addresses
45.55.50.15/19
10.17.0.5/16
CPUs
2 @ 1800 MHz
Physical Memory
2047 MB
Virtualization State
physical
Last Reboot
Wed Sep 7 12:54:19 EDT 2016
OMS Agent ID
cf7c0d1b-7750-43f7-8d49-3f04b3caa0d8
Dependency Agent Id
6652f34b-e02e-4cb8-9ca2-5c2c5fc075d7
Dependency Agent Version
8.2.4
Summary
Properties
Alerts
Changes
Performance
Security
Updates


Legend
Port 4475
admdemo-appsvr
8 Processes
backup.pl (Perl)
bluestripe-collector
curl
curl
master
omsagent (Ruby)
sshd
Tomcat
mysqld
Tomcat
Process Summary
Properties
Executable Name
java
Description
OpenJDK Runtime Environment
View More Properties...
Machine Dependencies
3 Connected Clients
4 Connected Servers
TCP Connections
4 Inbound Connections
4 Outbound Connections
0 Failed Connections
Ports Bound
5 Ports Bound
Port Numbers
8080
8005
8009
8080
8009
Summary
Properties
Alerts
Changes
Performance
Security
Updates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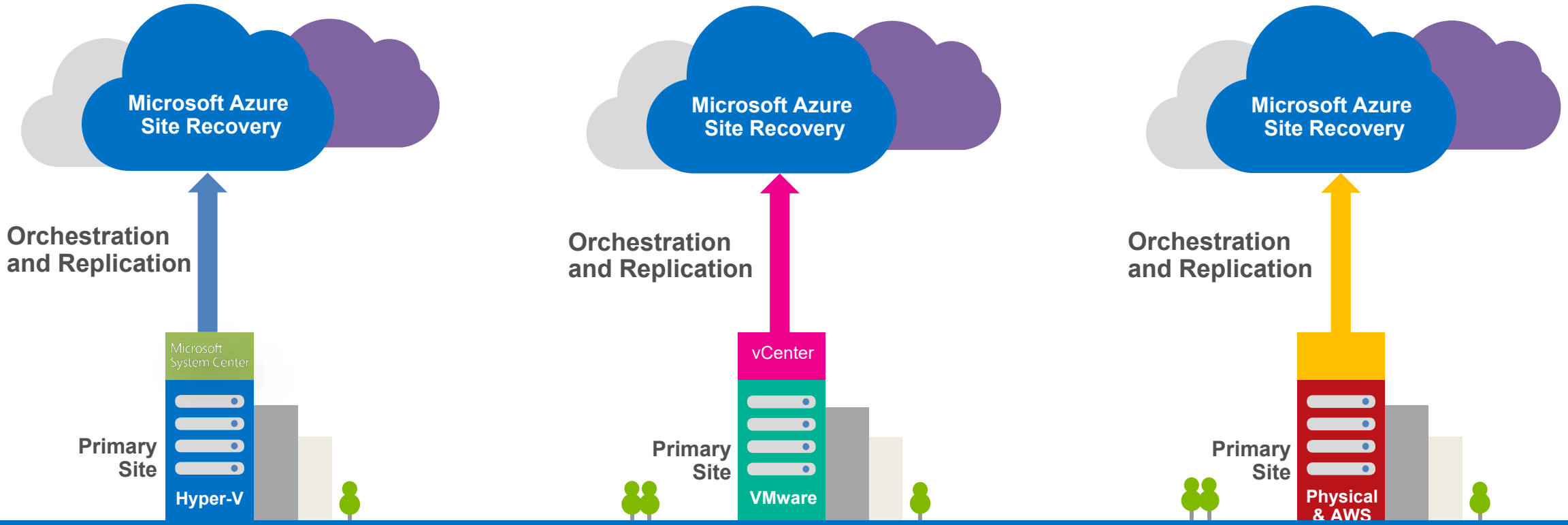
omsagent (Ruby)
sshd
Tomcat
Tomcat
Process Properties
Display Name
Tomcat
Executable Name
java
Description
OpenJDK Runtime Environment
Start Time
Wed Nov 9 11:19:11 EST 2016
Company Name
CentOS
Product Name
java-1.8.0-openjdk-headless-1.8.0.101-3.b13.el7_2.x86_64
Product Version
1.8.0.101
Working Directory
/
Command Line
/usr/lib/jvm/jre/bin/java -Djava.util.lo
Summary
Properties
Alerts
Changes
Performance
Security
Updates


MIGRATE

AZURE SITE RECOVERY

- BCDR tool
- 2 main components, Site Recovery Service and Backup
- Site Recovery Service is used for DR and migration purposes
  - Replicate workloads (physical and virtual)
    - Azure region >> Azure region
    - Primary datacenter >> secondary datacenter
    - **Primary datacenter >> Azure region**
  - **Failover** and failback capabilities
  - VMWare and Hyper-V Hypervisors are supported
  - Windows and Linux operating systems are supported
  - Application consistent snapshots
  - Non-disruptive testing
  - Customized recovery plans (integration with Azure Automation Runbooks)
- Will be integrated into Azure Migrate in the near future!
- It is suggested to use the ASR Deployment Planner before migration

Lift & Shift with Azure Site Recovery



Key features include:

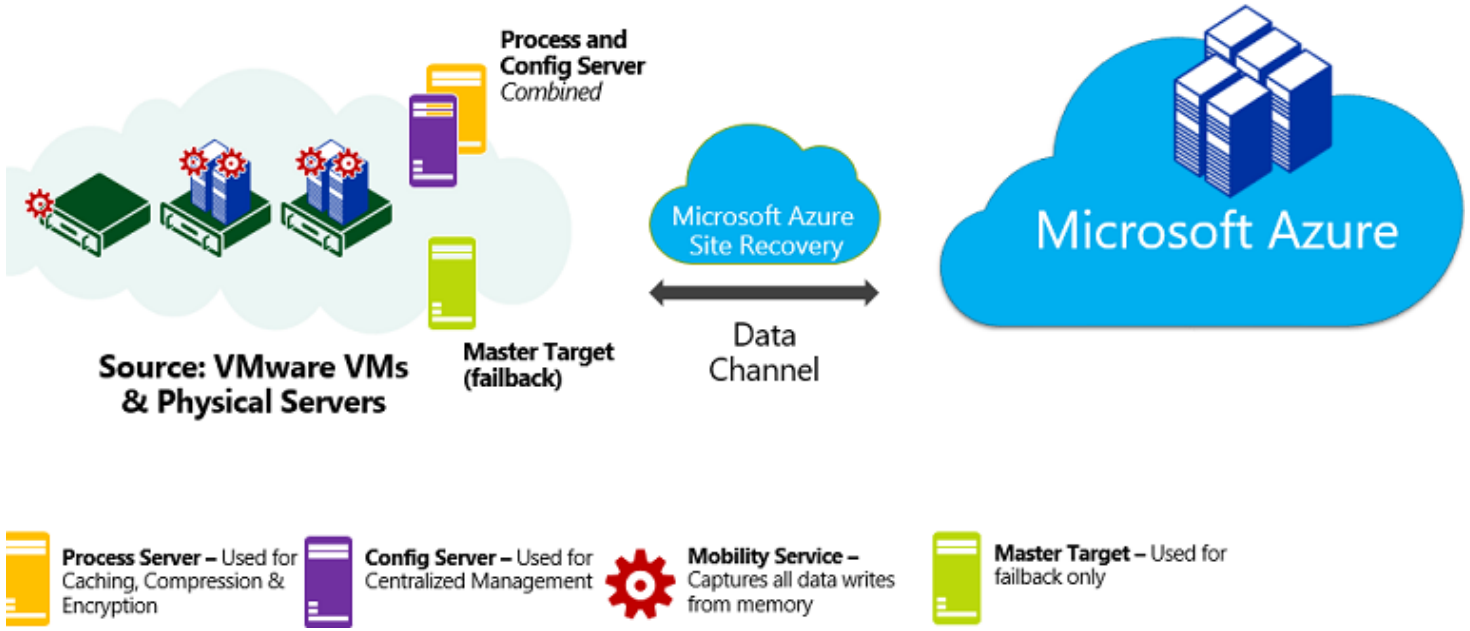
Automated VM protection and replication
Remote health monitoring
Near zero RPO

No-impact migration testing
Customizable recovery plans
Minimal RTO – few minutes to hours

Orchestrated migration when needed
Replicate to – and recover in – Azure
Heterogeneous physical and virtual support

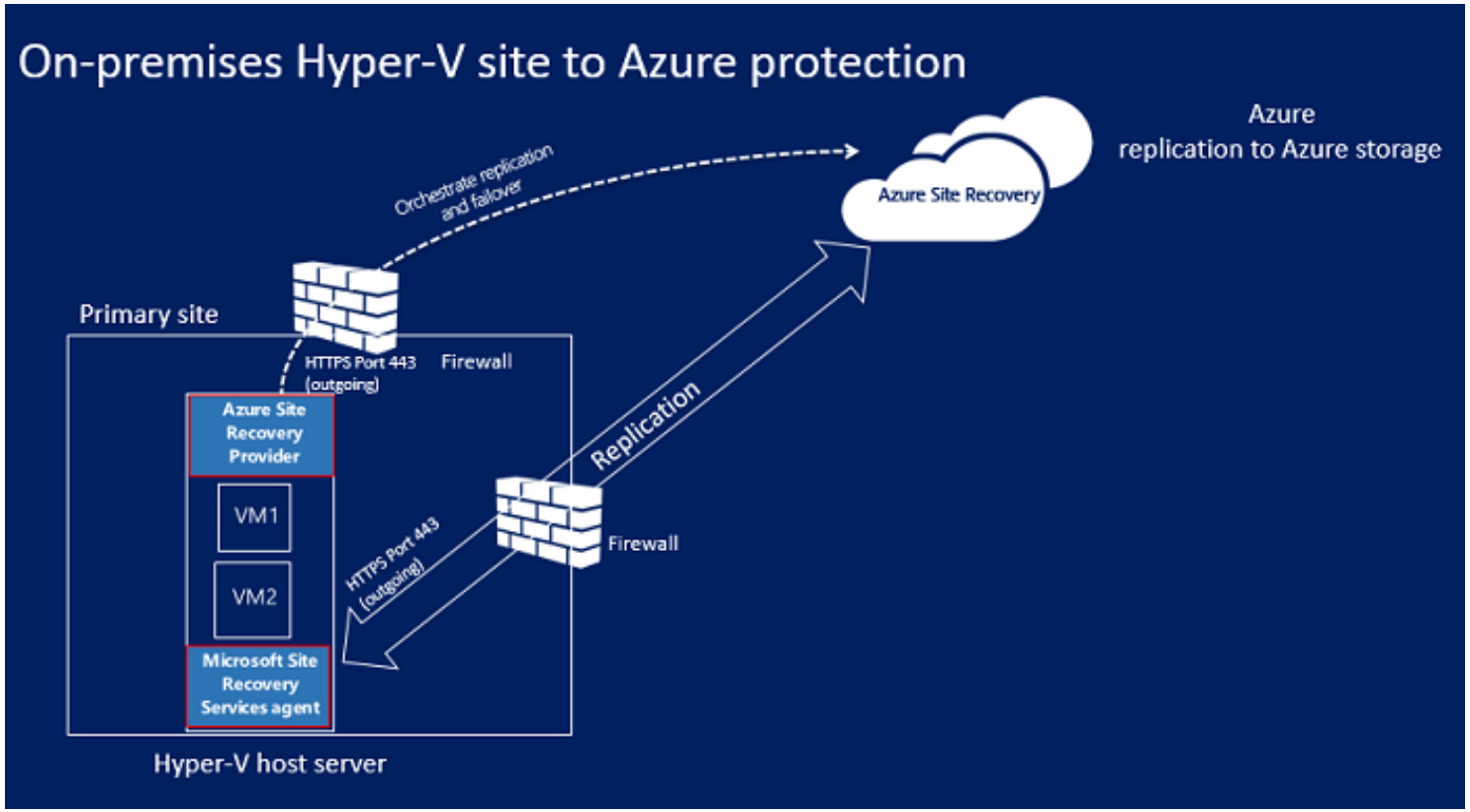
VMWare / Physicals scenario

- Deploy a Configuration/Process server from an OVF template onto VMWare
  - Configuration server provides communications between VMWare and Azure
  - Process Server provides replication capabilities to Azure
- Deploy a Master Target Server
  - Often combined with the Config/Process server
  - Handles failback replication data



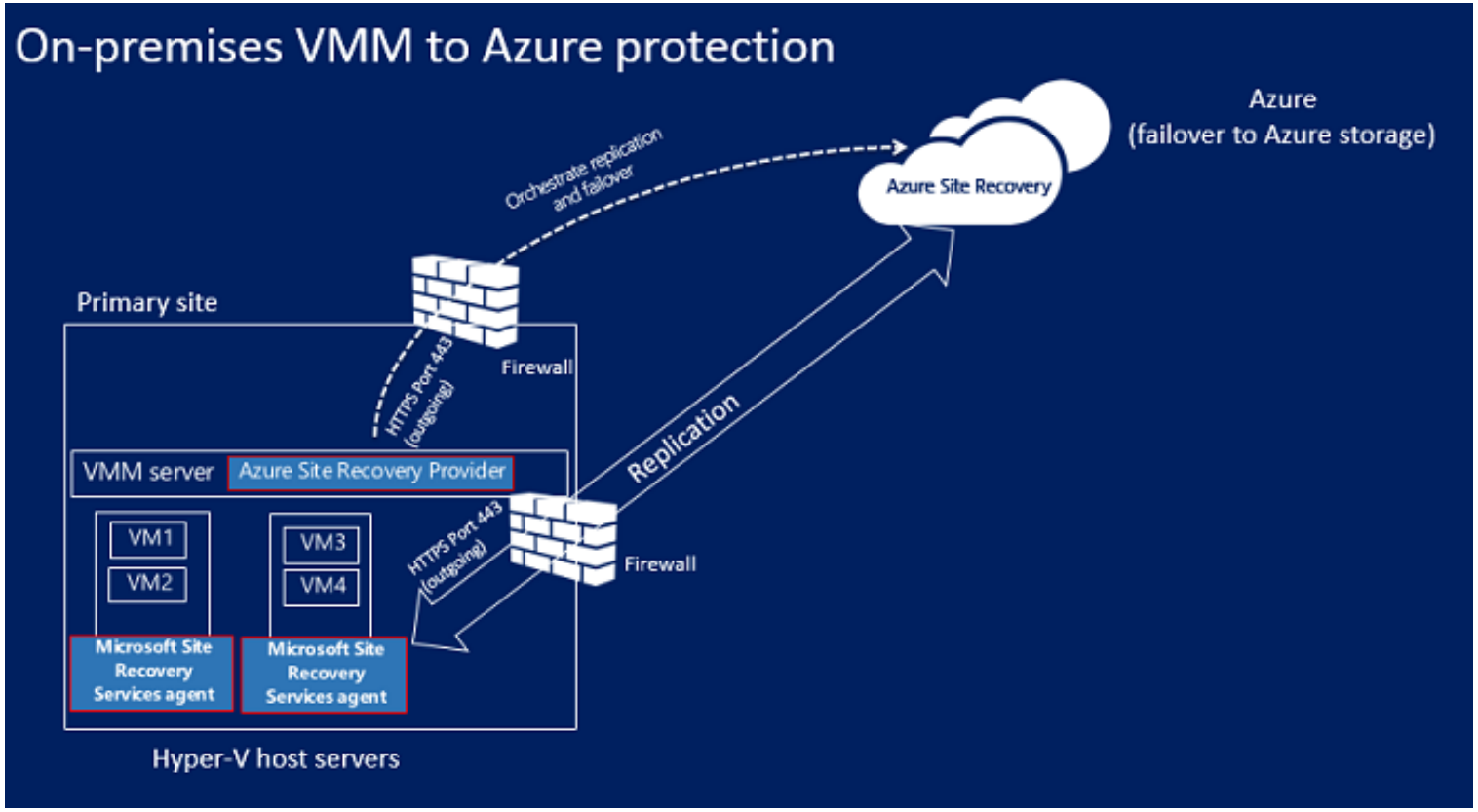
Hyper-V scenario without VMM

- Install the Azure Site Recovery Provider on every the Hyper-V host
- Install the Recovery Services Agent on every Hyper-V host



Hyper-V scenario with VMM

- Install the Azure Site Recovery Provider on the VMM server (communications on-prem <> Azure)
- Install the Recovery Services Agent on every Hyper-V host (replication on-prem <> Azure)



Azure site recovery - pricing

- Based on the number of instances protected

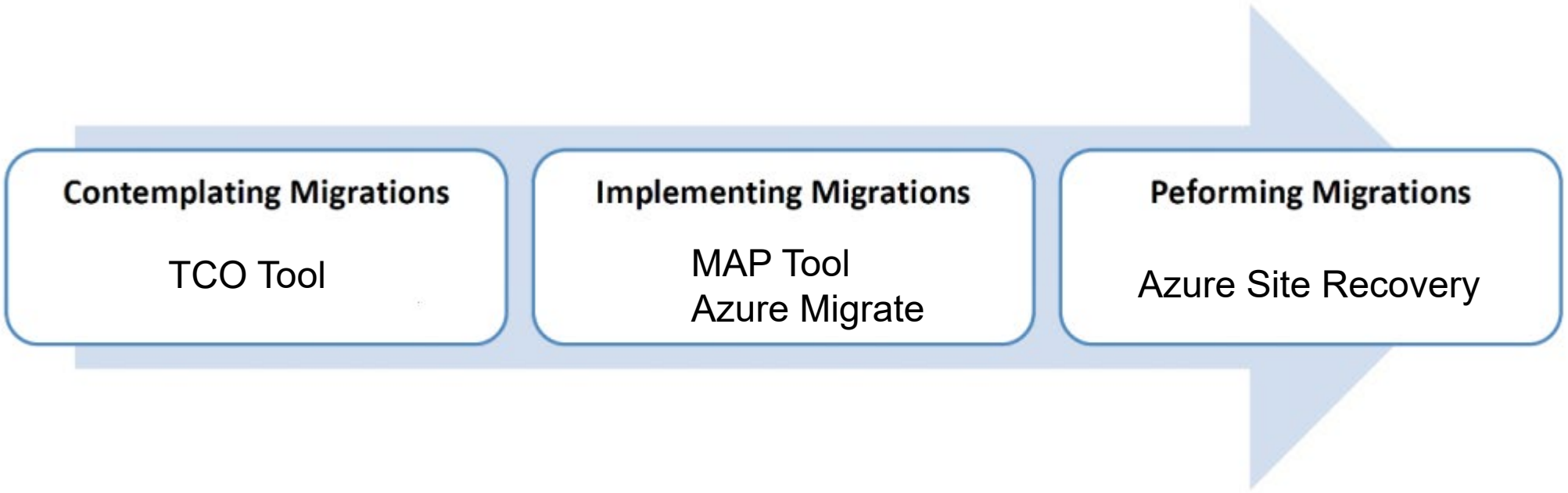
Pricing details

Azure Site Recovery is billed based on number of instances protected. Every instance that is protected with Azure Site Recovery is free for the first 31 days, as noted below.

	PRICE FOR FIRST 31 DAYS	PRICE AFTER 31 DAYS
Azure Site Recovery to customer owned sites	Free	€13.50/month per instance protected
Azure Site Recovery to Azure	Free	€21.09/month per instance protected

Azure Site Recovery between Azure regions is charged at the same rate as Azure Site Recovery to Azure.

- Average daily number of instances over a month
  - Example: first half of the month 20 instances, second half 0 >> 10 instances billed
- The first 31 days are free for **every instance** you start protecting
- Storage consumption is also charged


Contemplating Migrations
TCO Tool
Implementing Migrations
MAP Tool
Azure Migrate
Peforming Migrations
Azure Site Recovery


DEMO AZURE SITE RECOVERY


MANAGE & OPTIMIZE

Managing & optimize Azure infrastructure after migration

- Azure Backup
  - Secure backup of your Azure Virtual Machines (agentless)
- Azure Site Recovery
  - Leverage ASR for Disaster Recovery scenario's within Azure
- Azure Monitor
  - Becoming central plane for monitoring toolsets
  - Aggregates Alerts, Metrics, Log Analytics, Activity Log, Service Health, Application insights…
- Azure Advisor
  - Get recommendations accross different areas: HA, Security, Performance, Cost
- Azure Security Center
  - **Covered in a following session by Bart Verboven!**
  - Main location for all things Security in Azure

What's Next ?

	Technical Track	Services & Management Track
11:00-11:30	Break	
11:30-12:30	Migration to the cloud – part 2: Evolve from IaaS to PaaS *Stijn Verhoeven*	Why is Azure Governance crucial for the cloud – part 2 *Jan Coucke*