Presidio Cloud Solutions

Azure HPC Cluster

Deploying Azure High Performance Compute

Running Application Workloads via HPC

PRESIDIO®

Future. Built.

Presidio – Cloud Technical Presales

Bret Gessner
bretgessner@presidio.com
1-646-293-6911

Mark Grigoletto
mgrigoletto@presidio.com
1-646-293-6907

PRESIDIO®
Future Built

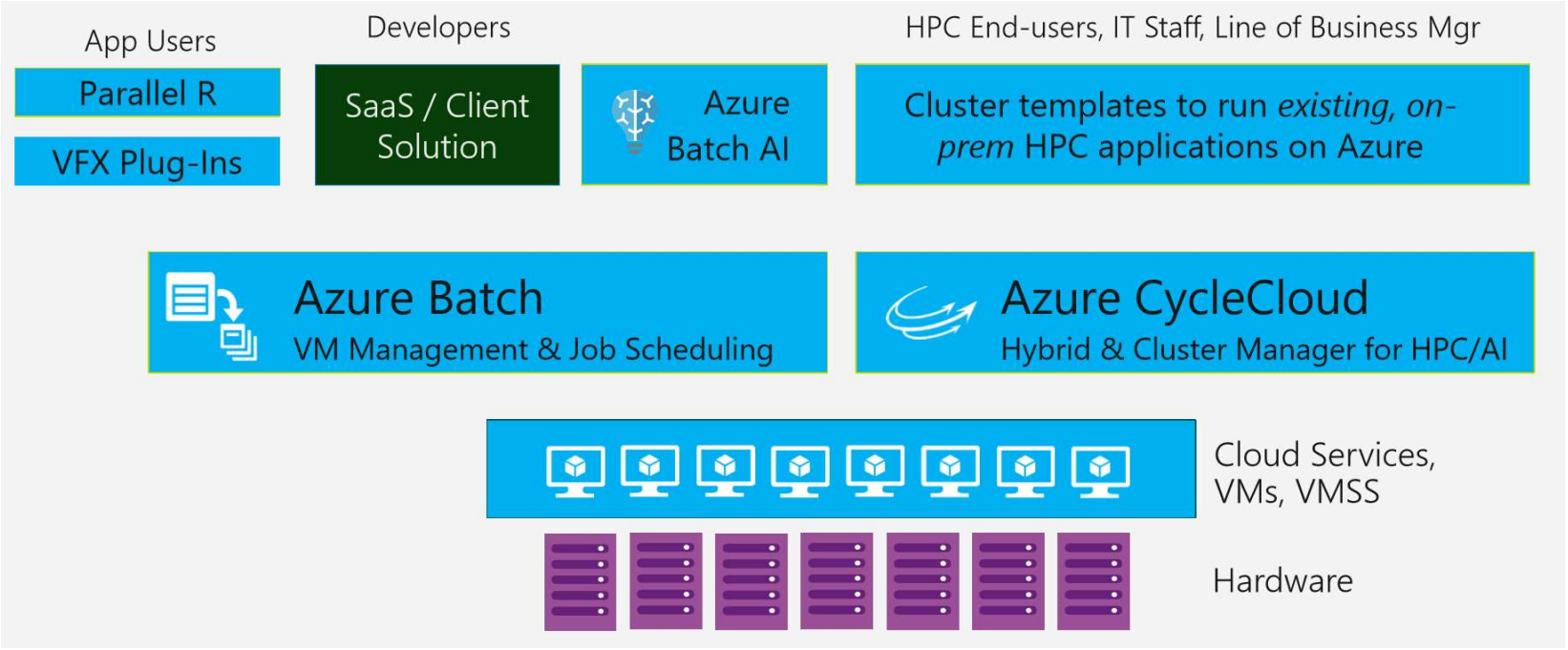
Presidio Cloud Solutions

Getting Started with Azure HPC

- Envisioning and Design
- Planning, Guidance and Architecture
- HPC Discussion Points

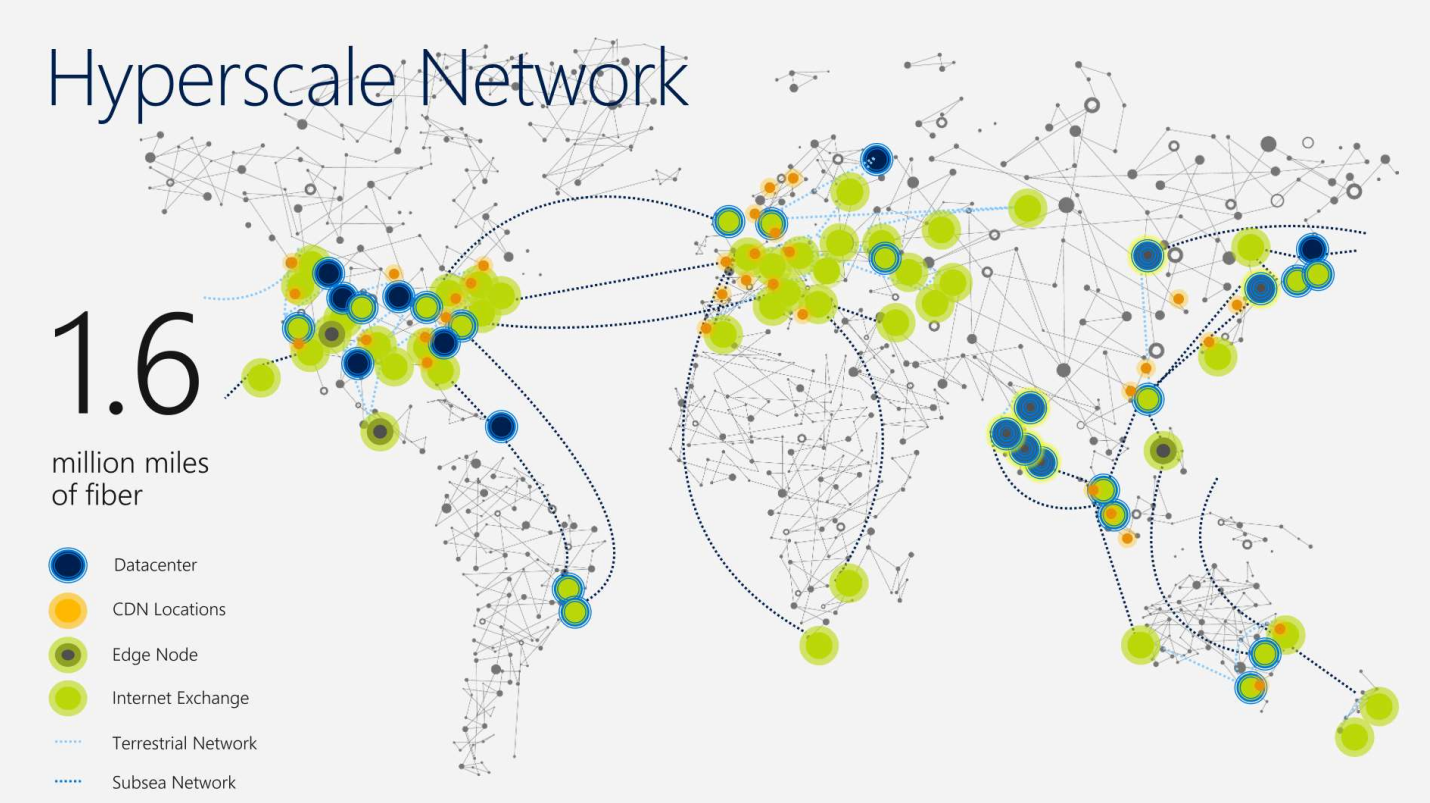
PRESIDIO®
Future. Built.

Azure Big Compute – Framework & Platform



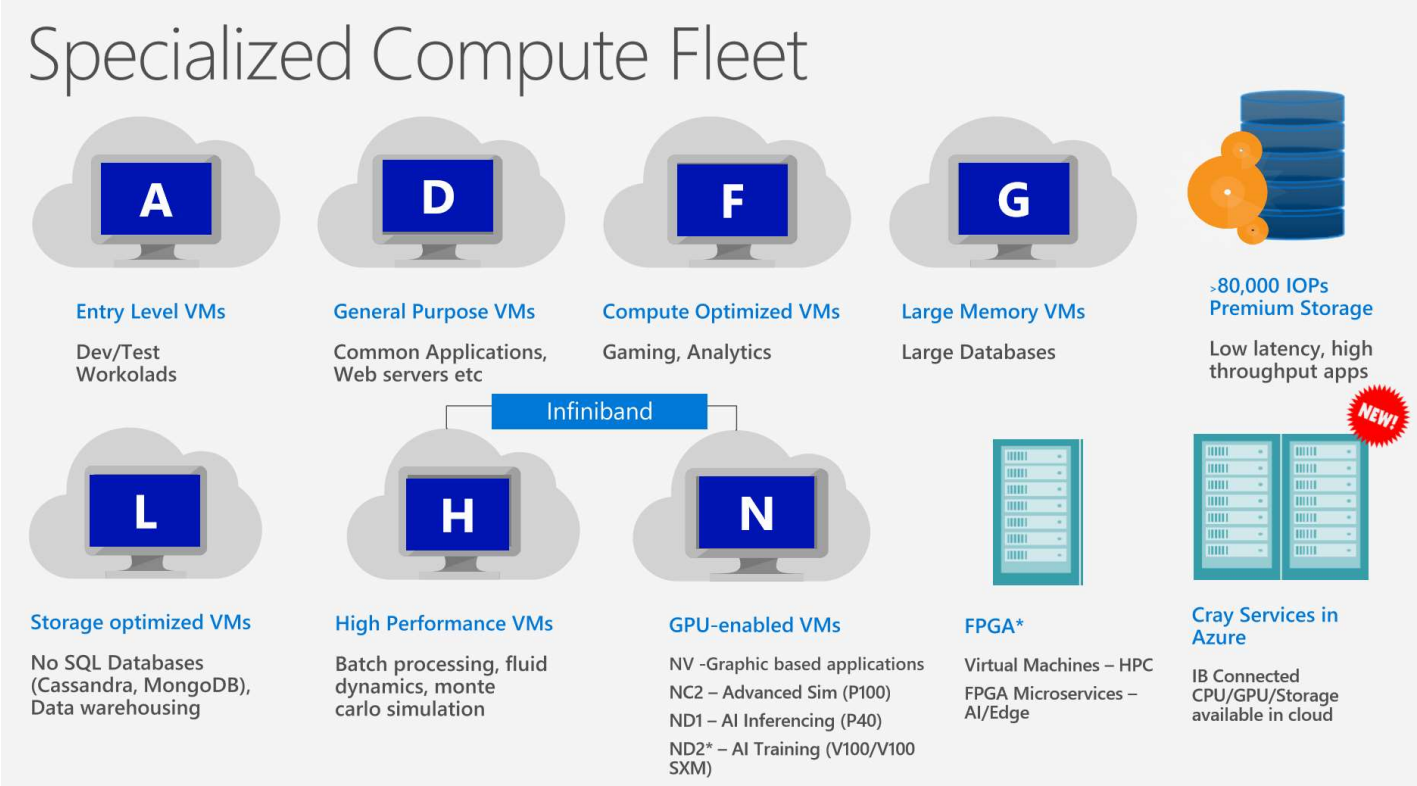
PRESIDIO®
Future. Built.

HPC – Network Design is CRITICAL



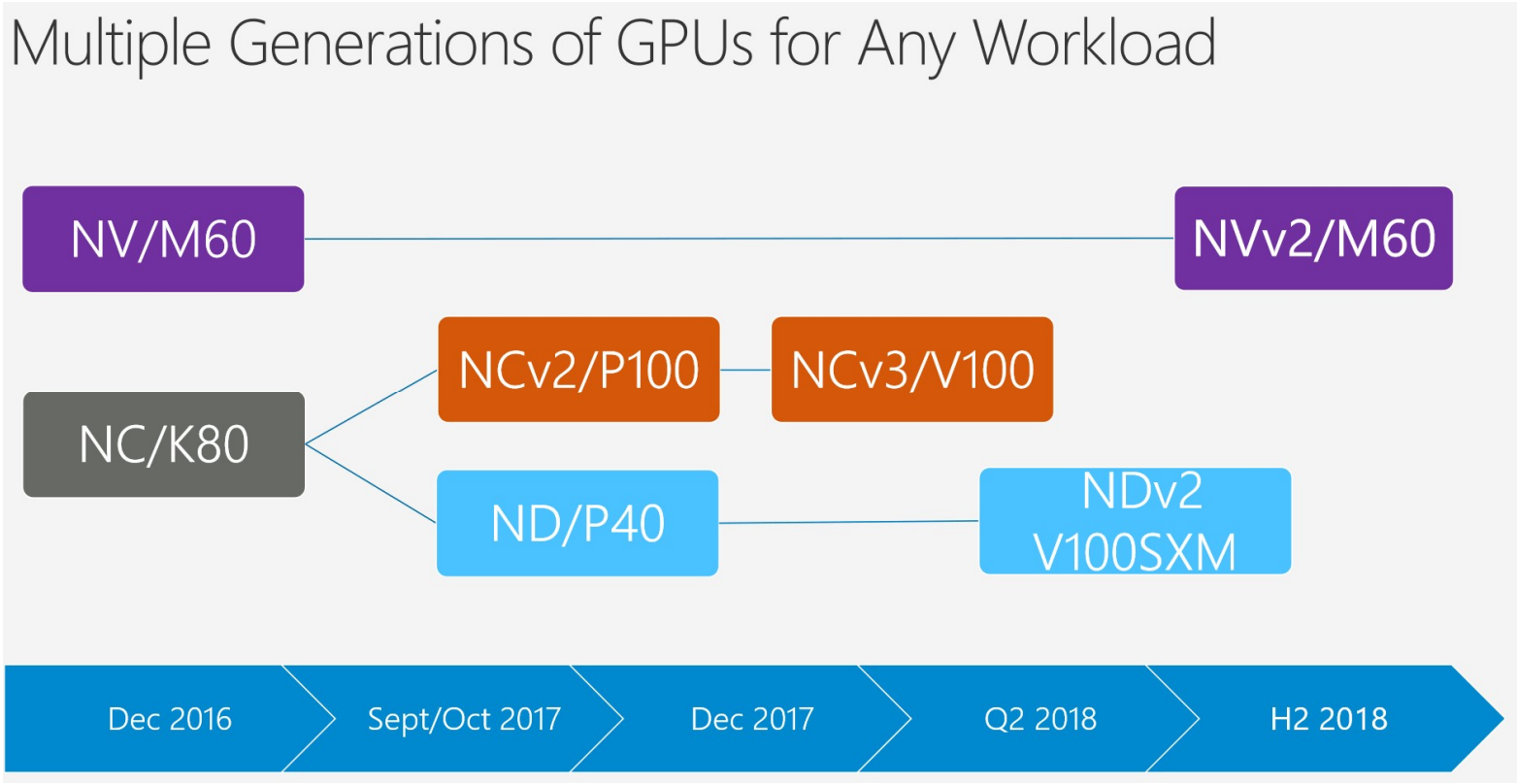
PRESIDIO®
Future. Built.

Presidio Capabilities – Scalesets to HPC



PRESIDIO®
Future. Built.

GPU Workloads - Roadmap



PRESIDIO®
Future. Built.

Azure Hardware – Moving Forward

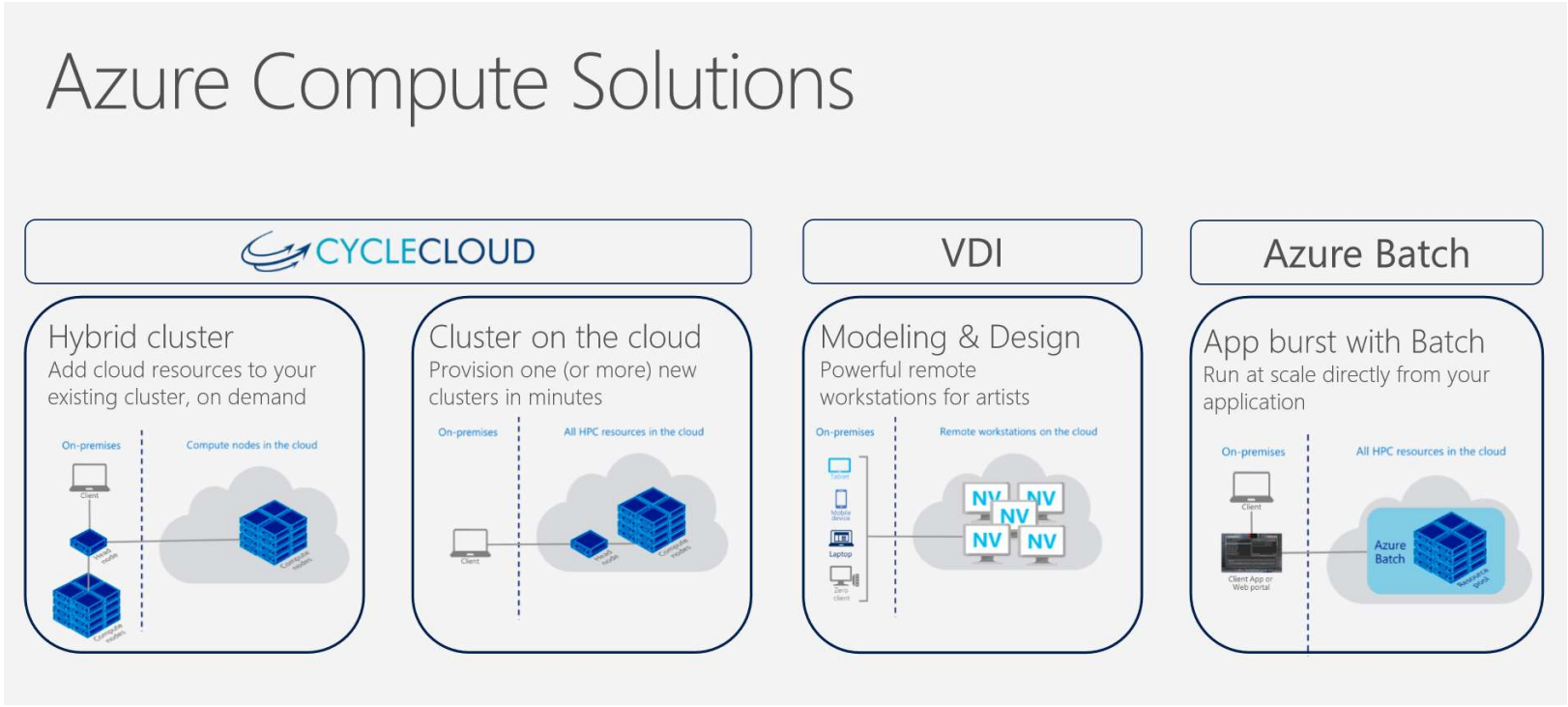
NC_v3 – Volta Generation GPU Compute

- Volta PCIe GPU instances - NVIDIA V100 GPUs
- Excellent for accelerating machine training jobs and HPC
- Premium storage support (SSD backed)
- Availability:
  - Today: West US 2, East US, West EU, South East Asia, US South Central
  - Shortly: UK South, China East 2, Central India, Australia East, Canada Central+
- Specs:
  - 640 NVIDIA Tensor Core
  - FP64 - 7 TFLOPS of double precision floating point performance
  - FP32 - 14 TFLOPS of single precision performance
  - GPU Memory 16 GB

	NC6s_v3	NC12s_v3	NC24s_v3	NC24rs_v3
Cores	6	12	24	24
GPU	1 x V100 PCIe	2 x V100 PCIe	4 x V100 PCIe	4 x V100 PCIe
Memory	112 GB	224 GB	448 GB	448 GB
Local Disk	~700 GB SSD	~1.4 TB SSD	~3 TB SSD	~3 TB SSD
Network	Azure Network	Azure Network	Azure Network	Azure Network + InfiniBand

PRESIDIO®
Future. Built.

Clusters, VDI, Batch – Mixed Workload Capabilities



PRESIDIO®
Future. Built.

Azure + Linux = BETTER TOGETHER

Virtual Machines

Ubuntu, Red Hat, Windows, SUSE, CoreOS

DevOps Extensions with Chef and Puppet

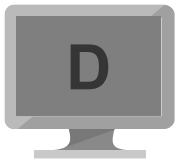
Multiple sizes

Hundreds of items in marketplace

PRESIDIO®
Future. Built.

Azure VM Sizes - Review

Lowest Price



SSD Storage
Fast CPUs

New generation
of D family VMs

High memory and
Large SSDs

New A-Series

Compute Intensive

NVIDIA GPUs
K80 Compute

NVIDIA GPUs
M60 Visualization

Fastest CPU
IB Connectivity

Large SSDs

SAP Large Instances

Deep Learning
NVIDIA P40s

New gen of NC
NVIDIA P100s

New generation of D
family

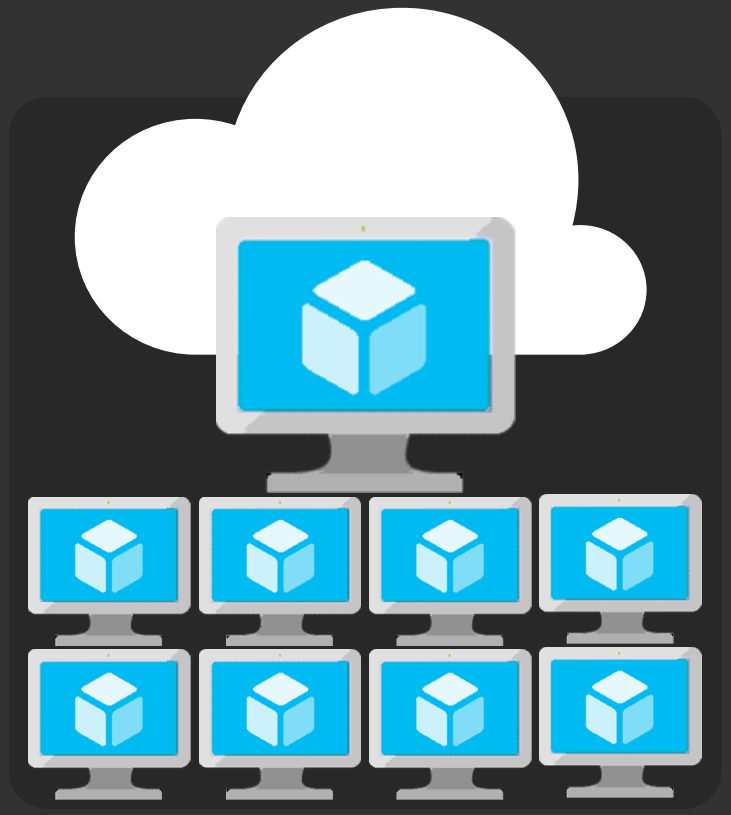
High memory

PRESIDIO
Future. Built.

Presidio Expertise and ISV Partners

Azure Scaling vs. HPC

VM Scale Sets



High performance provisioning of 1000+ VMs

Auto-configuration at scale

Auto-scale based on schedule and resource metrics

Easy updates at scale

Simple Portal Integration

PRESIDIO®
Future. Built.

Why VM Scale Sets?

- Manually **scale** with ‘capacity’ property
- **Autoscale** with host metrics (MDM pipeline) or diagnostic extensions
- Small buy-in: Deploy/manage sets of 0->100 identically configured VMs
- **Guest OS patching**: Patching primitives allow manually triggered rolling upgrades
- **High-availability** – implicit availability set with 5 FDs/5 UDs

```
244     {
245       "type": "Microsoft.Compute/virtualMachineScaleSets",
246       "name": "[parameters('vmssName')]",
247       "location": "[parameters('resourceLocation')]",
248       "apiVersion": "[variables('computeApiVersion')]",
249       "dependsOn": [
250         "storageLoop",
251         "[concat('Microsoft.Network/loadBalancers/', variables('loadBalancerName'))]",
252         "[concat('Microsoft.Network/virtualNetworks/', variables('virtualNetworkName'))]"
253       ],
254       "sku": {
255         "name": "[parameters('vmSku')]",
256         "tier": "Standard",
257         "capacity": "[parameters('instanceCount')]"
258       },
259       "properties": {
260         "overprovision": "true",
261         "upgradePolicy": {
262           "mode": "Manual"
263         },
264         "virtualMachineProfile": {
```

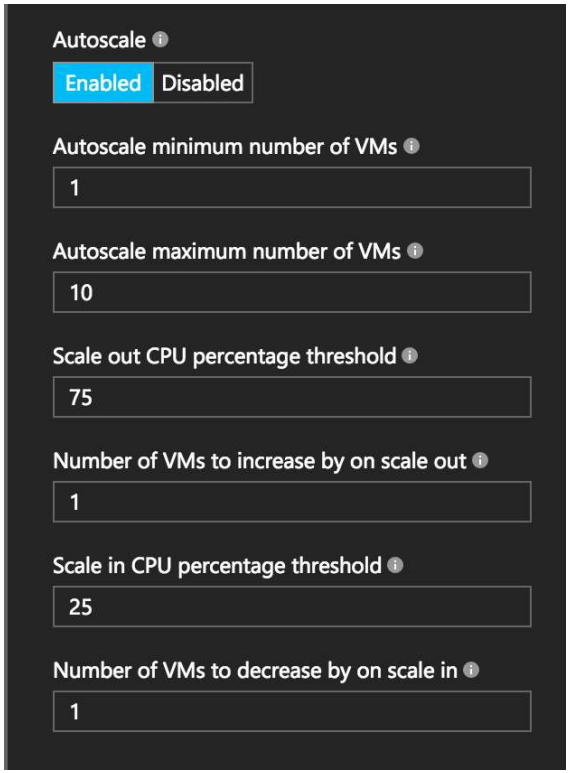
Availability Sets vs Scale Sets

- Avail Set: Multiple different VMs (image, size, etc); managed separately
- Scale Set: Large count of the same VMs; managed together
- Scale set: Reliable rapid provisioning and scale utilizing similarity of the VMs

PRESIDIO®
Future. Built.

Autoscale with VM Scale Sets

- Define Max – Min VMs
- Define trigger and action rules
- Standard audit / email notifications
- Define webhooks for custom notifications and actions (e.g. runbooks)

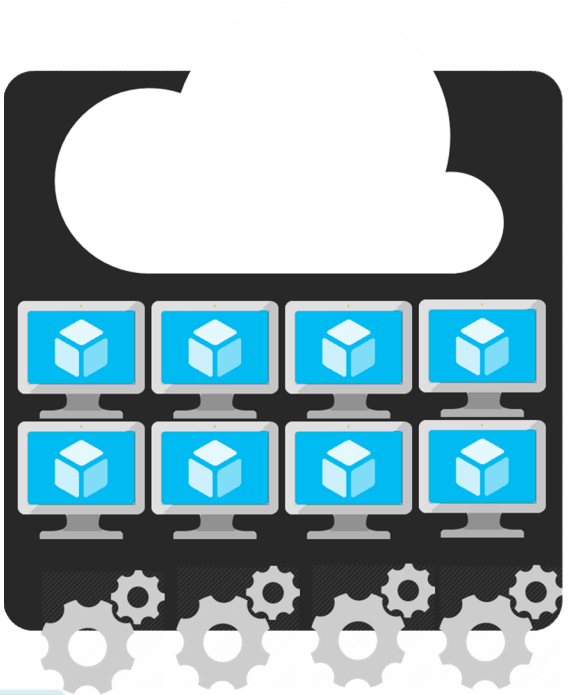


PRESIDIO®
Future. Built.

VM scale set app deployment models

Model	When to use
Marketplace	Off the shelf solutions.
VM Extensions	Full control over app lifecycle management.
Custom data/unattend	Install custom app independently of external network.
Configuration manager	Centrally managed app installation, credentials & maintenance.
Containerized	Abstract app management from infrastructure. Cloud/DC agnostic.
Custom image	Small self-contained apps. Fast deploy. Immutable build, test, deploy pipelines.

Azure Batch



Compute pools for job processing

Automatic scaling and regional coverage

Linux and Windows

Automatically recover failed tasks

Input/Output handling

Low-Pri (discounted) option

PRESIDIO®
Future. Built.


Containers
PRESIDIO®
Future. Built.

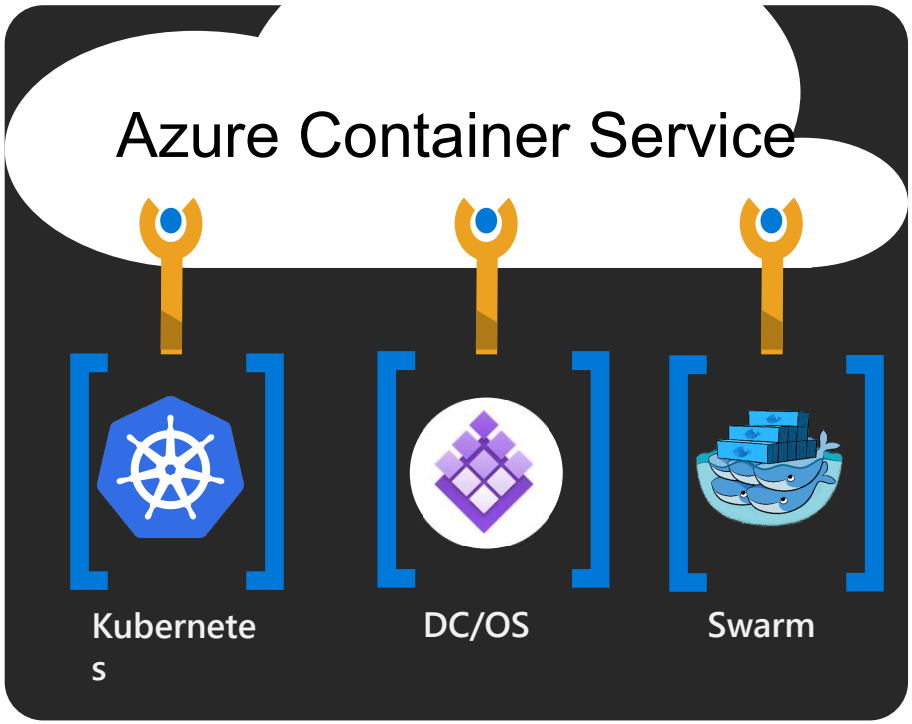
Azure Container Service

Standard Docker tooling and API support

Streamlined provisioning of DCOS and Docker Swarm

Linux and Windows Server containers

Azure and Azure Stack



PRESIDIO®
Future. Built.

Azure Container Instances

Simplest and easiest way to run individual containers in the cloud

No VM management

Per-second billing with customized resource requests

Linux and Windows Server containers

PRESIDIO®
Future. Built.

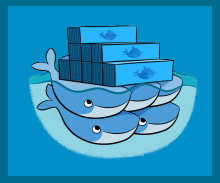

Developer Platforms
PRESIDIO®
Future. Built.

Azure Service Fabric

Hyperscale Microservices platform

Highly scalable

24 X 7 availability



Windows and Linux Container Orchestration

DevOps and Lifecycle management

Managed platform

Built-in auto scale and load balancing

High availability with auto-patching

Health & Monitoring

Available on Private cloud, Public Cloud & Hosted Cloud

High productivity development

Simple Programming models for .NET, Java

Stateful microservices

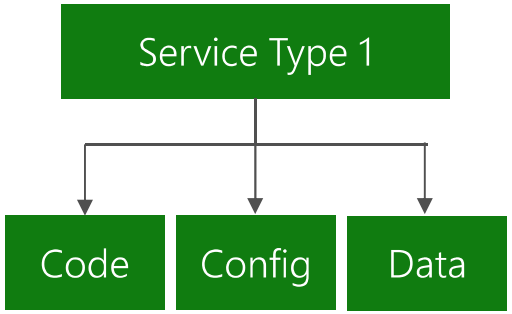
Learn easily using Party clusters

Simple tooling with Visual Studio, Eclipse & Yeoman

PRESIDIO®
Future. Built.

Service type

- Services types are composed of code/config/data packages
  - Code packages define an entry point (dll or exe)
  - Config packages define service specific config information
  - Data packages define static resources (eg. images)
- Packages can be independently versioned

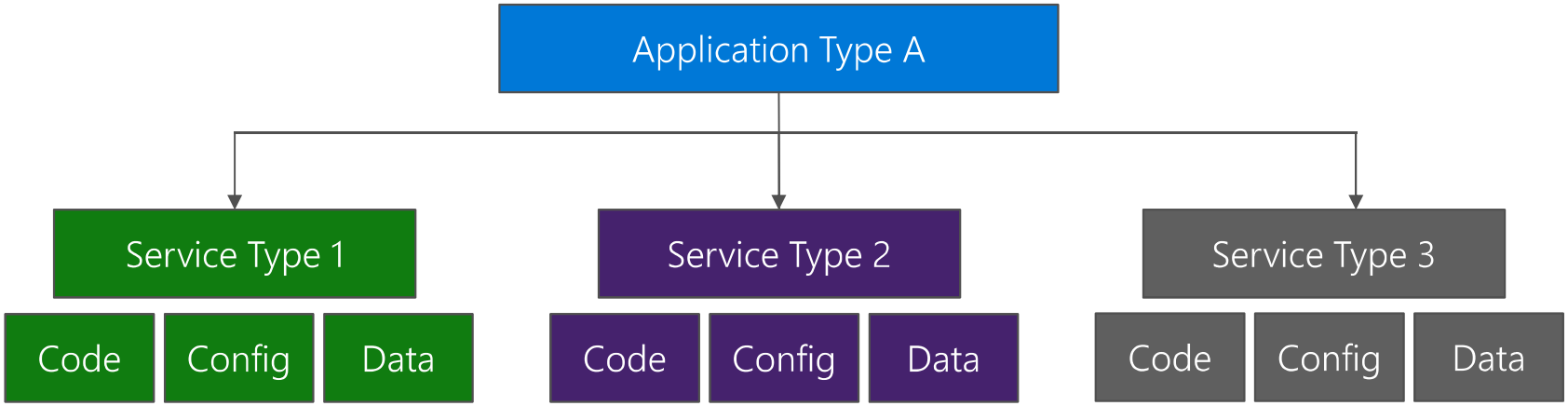



```
<ServiceManifest Name="QueueService" Version="1.0">
 <ServiceTypes>
    <StatefulServiceType ServiceTypeName="QueueServiceType" HasPersistedState="true"
/>
  </ServiceTypes>
  <CodePackage Name="Code" Version="1.0">
    <EntryPoint>
      <ExeHost>
        <Program>ServiceHost.exe</Program>
      </ExeHost>
    </EntryPoint>
  </CodePackage>
  <ConfigPackage Name="Config" Version="1.0" />
  <DataPackage Name="Data" Version="1.0" />
</ServiceManifest>
```

PRESIDIO®
Future. Built.

Application type

- Declarative template for creating an application
- Based on a set of service types
- Used for packaging, deployment, and versioning



PRESIDIO
Future. Built.

Azure App Service

Enterprise-grade apps

Global data center footprint

Hybrid support

AAD integrated

Secure + compliant

Fully managed platform

Built-in auto scale and load balancing

High availability with auto-patching

Reduced operations costs

Backup and recovery

High productivity development

.NET, Java, PHP, Node, and Python

Staging and deployment

Source code control integration

App gallery marketplace

PRESIDIO®
Future. Built.

Azure Functions

Serverless

Event-driven scale

Reduced Dev Ops

Accelerate development

nodeJS

C#

Develop your way

Local development

Bind into services

Azure Service Bus

Azure Event Hub

Azure Storage

Dropbox

Sendgrid

AzureDocDb

OneDrive

Box

Twilio

PRESIDIO®
Future. Built.

Summarizing the options

Service	Best used for…
VMs	Lift-and-shift for a set of “pets”
VM Scale Sets	Scaling and managing a set of identical VMs
Batch	Highly parallelized computation
Container Service	Deploying and managing a set of arbitrary Linux containers
Container Instances	Running individual containers with low overhead and no VM management
Service Fabric	Building microservice-based applications on Windows using .NET
App Service	Building standard web and mobile apps with limited management responsibilities
Functions	Building small, event-driven software with granular auto-scale
3rd party solutions	Enabling multi-cloud strategies

PRESIDIO®
Future. Built.

Key recommendations for choosing a service

- Target the highest acceptable level of abstraction
  - If you don't need control of something, let Microsoft handle it
  - Just make sure you're ok with the restrictions
- Don't fall victim to 'analysis paralysis'

PRESIDIO®
Future. Built.

About Presidio….

For More Information:

Bret Gessner
bretgessner@presidio.com
1-646-293-6911

Mark Grigoletto
mgrigoletto@presidio.com
1-646-293-6907

PRESIDIO®
Future Built

Why Presidio for Cloud?

- We understand digital infrastructure – 25 years designing comprehensive solutions
- Cloud practice group with 80 dedicated people in North America and growing. National & Local in-region. (Q3 119M Rev/57%)
- Comprehensive Partnerships with major leading Cloud providers. Microsoft, AWS & Google
- Finance optimization -> Leverage the power of Presidio Clients and balance sheet.
- Deep engineering skills on planning, designing, optimizing and managing & cloud migrations.

PRESIDIO®
Future. Built.

Presidio and Microsoft Relationship

- Nationally Managed Partner- Gold status
  - Dedicated National Partner Management
    - Certified Sales and Engineering resources locally
    - Advanced technical solutions previews
  - Locally Dedicated Partner Engagement Manager
    - Helping to make sure of client satisfaction
    - Dedicated escalation path
    - TAP programs
- Practices
  - Azure Cloud Services
    - Azure Network Assessment Services
    - Cloud Governance
    - Applications assessment Service
    - ExpressRoute Expertise
    - Azure Stack Design and Implementation Services

PRESIDIO®
Future. Built.

Presidio and Microsoft Relationship

- Practices continued
  - Office 365
    - Assessment Services
    - Migration and Deployment Services
    - Skype for Business Assessment, Design and Rollout services
  - Windows Architecture and Deployment services
    - Active Directory Design Services/Azure Active Directory
    - Windows 10 Design and Rollout Services
    - Citrix on Azure Design and Deployment
    - Application Rationalization Services

Presidio and Microsoft Relationship

- CSP-Presidio is a licensed reseller of MSFT Cloud Services

  Benefits of using Presidio as your CSP
  - Single stop for both billing and technical service
  - Advanced technical support(Certified Engineers)
  - Admin portal control
  - Monthly billing
  - 24X7 Support
  - Potential licensing discounts with services bundled

PRESIDIO®
Future. Built.