Crayon

vmware by Broadcom

We will begin shortly...

VCF Monetisation & TCO: Lunch and Learn

15th May 2025 | 12:00 PM- 2:00 PM AEST

In Person Venue - VMware by Broadcom Sydney Office, 8/175 Pitt St, Sydney NSW 2000

Online Attendance - Microsoft Teams Webinar

Crayon

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HYBRID EVENT

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Meet The Speakers

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Agenda

- Enablement Objective
- CSP Transition to VCF 9
- Infrastructure Optimizations
  - Host / Core
  - Networking
  - Storage
- License Portability (BYoS)
- Monetization

Outcomes

VCF Solutions Accelerate CSPs GTM

Enabling our CSPs to deliver differentiated solutions to market

VCF Platform & LCM	VCF Compute	VCF Storage	VCF Networking & LB
Data Protection & DR	Migration	Containers	Data & Developer Services
Security	Cloud Management & Monitoring	Network Monitoring	Ecosystem
Sovereign Cloud	Private AI	Edge	VCF API & Orchestration

CSP Solutions

- Differentiated
- Vertically Aligned
- Professional & Managed Services

Optimization and Monetization of VCF-based Services

Enablement Outcomes

- Objective
  - Enable you to deliver differentiated cloud services through the adoption of the full VCF stack and the enhancement or development of new VCF-powered offerings
- Outcome
  - Identify 2 to 3 candidate services from the VCF Solution Catalogue for each of **Optimization** and discovery and deeper investigation for **Monetization**

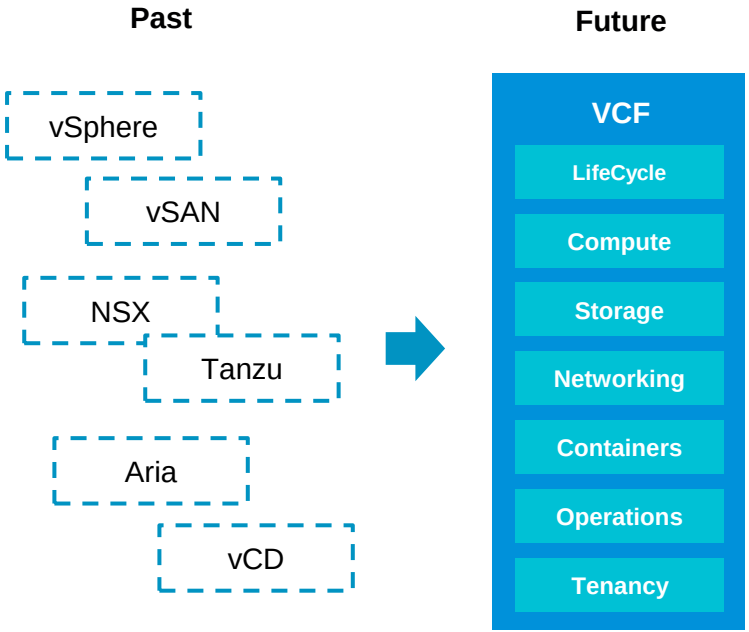
Accelerating CSP Growth

CSP Transition to VCF 9.x

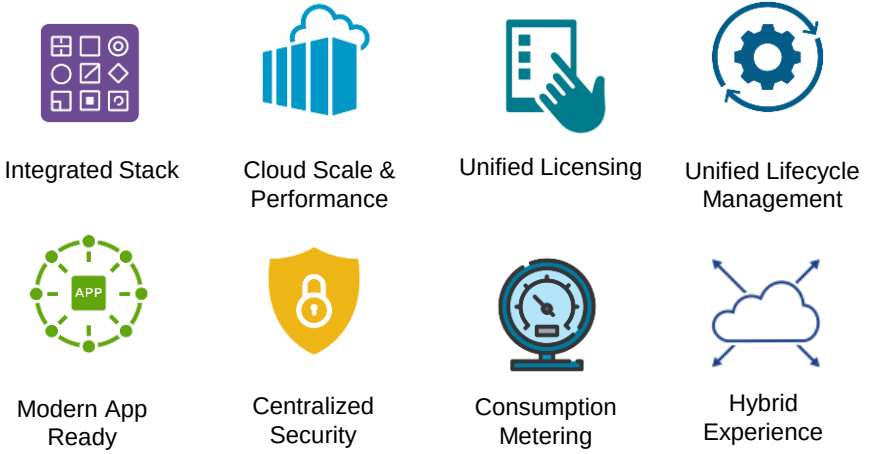
Unifying The VMware Technology Stack

Simplification through a unified technology stack & product offering

Unified Products…



...Simplified Consumption



CSP Transition to VCF 9

Moving to VCF will be a transitional journey

Phase 1

Product Enablement & Evaluation

Today!

Gain a full understanding of VCF 9.x capabilities, features and design considerations

Phase 2

Transition Readiness Planning

Assess your infrastructure against new VCF 9.x capabilities to develop your migration plans, design / operational changes and overall migration readiness

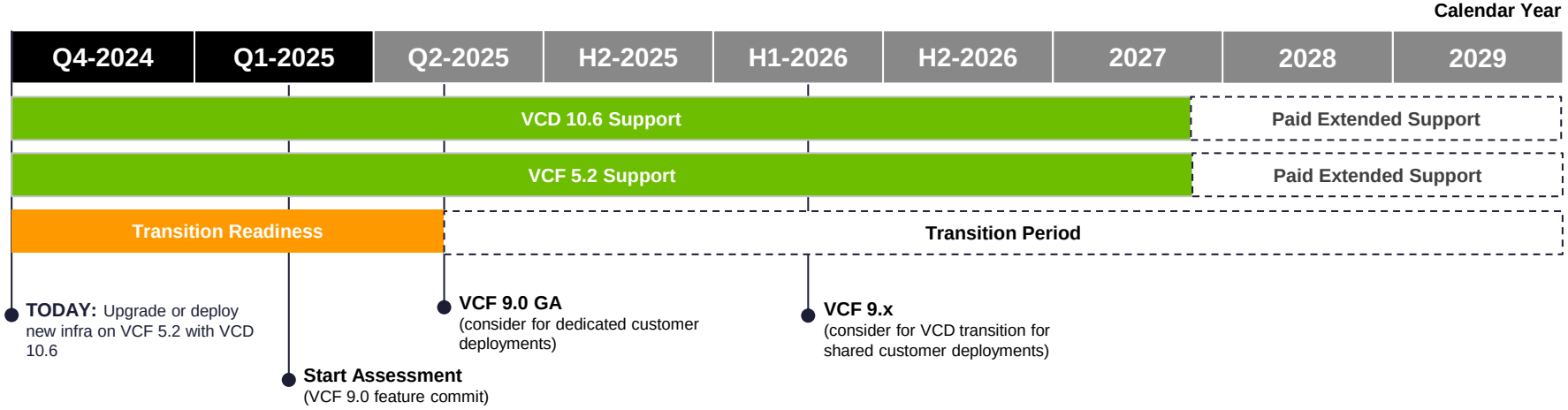
Phase 3

Transition Execution

Execute your transition to VCF 9.x using in-house resources or Broadcom Professional Services

CSP Transition to VCF 9

Current guidance for transitioning from VCF 5.x / VCD 10.6 to VCF 9.x *



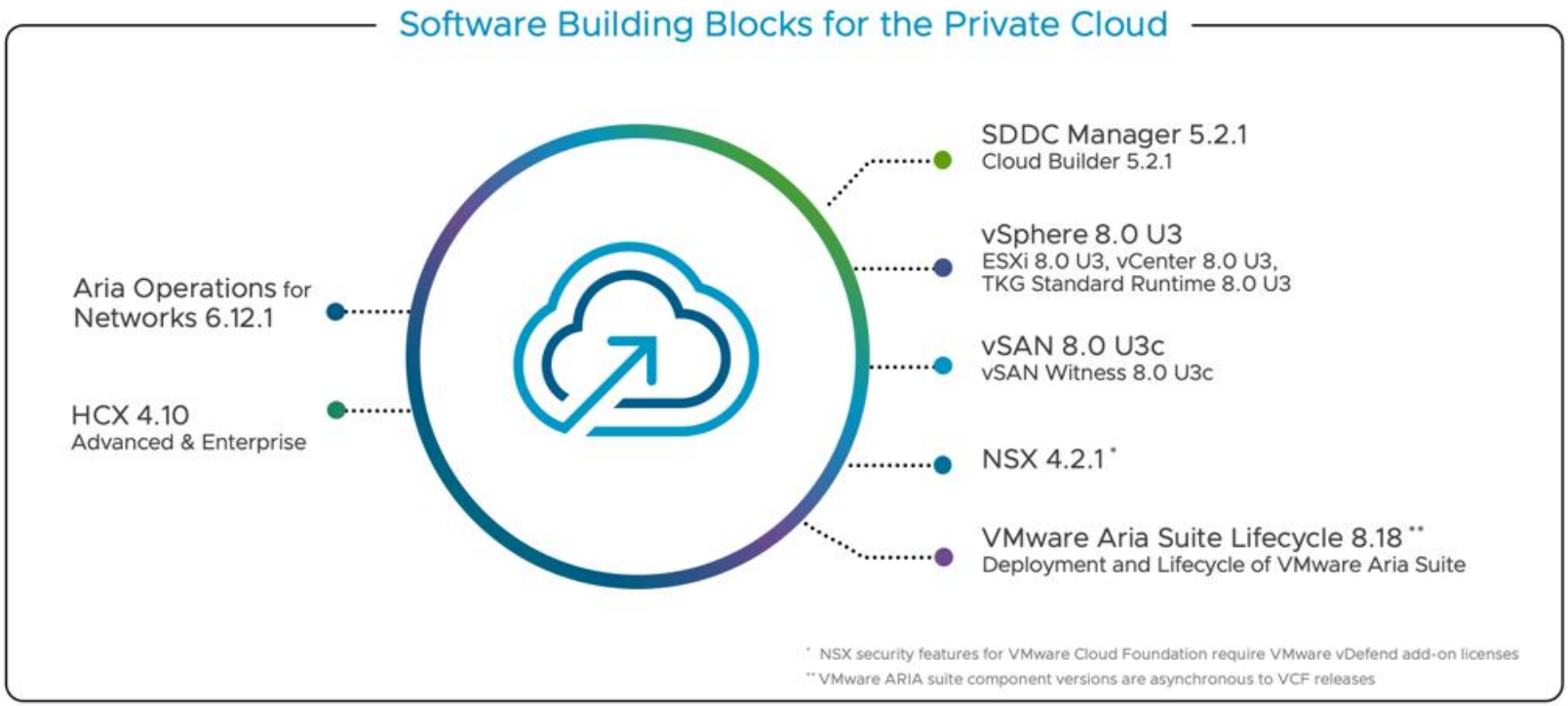
Key Considerations

- Initial 9.0 GA likely more suitable for **dedicated customer** deployments, with following releases providing more mature feature parity to transition from VCD for **shared** environments
- CSPs can start their assessments once VCF 9.0 GA release features are locked & committed
- Transition starting point for CSPs will vary based on initial VCF 9.x release features, combined with each CSPs unique requirements and use cases
- Extended support options are available to assist with extended transition duration

* Subject to change

Step-1 : Upgrade to VCF 5.2.1 BOM

VMware Cloud Foundation 5.2.1 contains the following VMware products



Step - 2 : Plan for VCF 9.x

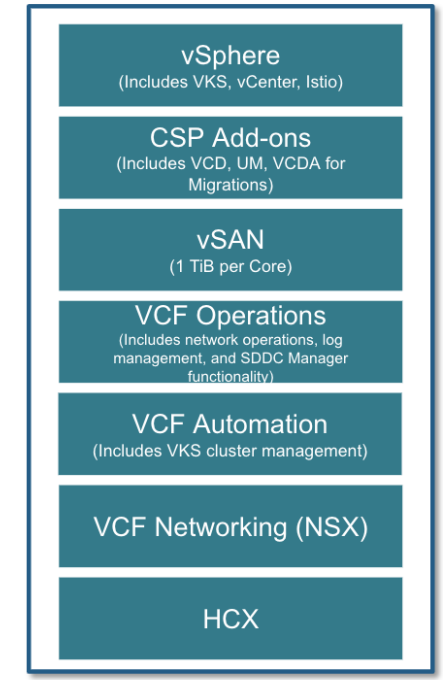
Preposed Plan

- Apply the VCD patch to enable compatibility with vSphere 9 and NSX 9
- Deploy the VCF Installer and import the existing vSphere 8.x and NSX 4.2.x environment
- Upgrade vSphere and NSX to version 9
- At this stage, the CSP will continue operating VCD 10.6.x on top of vSphere 9 and NSX 9
- Continue to evaluate VMware Cloud Foundation Automation (VCFA) and if good with feature then plan for switch over from vCD to VCFA

Infrastructure Optimizations

Significant Value to Unlock with VCF

Focused optimization guidance to accelerate CSP growth & profitability



The Challenge

- Unit of measurement was vRAM

  ⟶ Environment not optimized for the current license model (CPU Cores)

- Historically additional features and capabilities that are now bundled with VCF came at additional (significant) cost

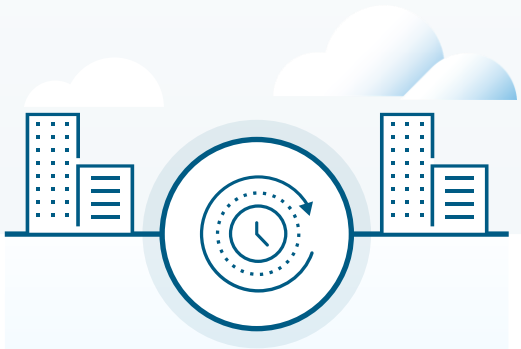
  ⟶ Limited uptake of value-added features

Optimization Approach

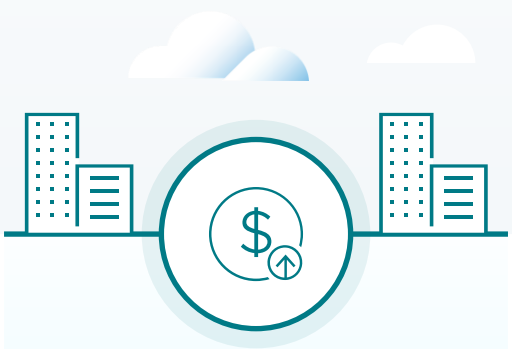
- Develop and execute a plan to optimize the architecture for Core licensing
- Leverage VCF functionality to driving both internal *operational efficiency* and further *monetization opportunities* with end-customers
- Notable inclusions are Aria Suite Enterprise (VCF Operations, VCF Automation, Aria Operations for Networks Enterprise (VRNI), VCF Networking (NSX), HCX, vSAN and SDDC Manager

Why Optimise? Commit Contracts are Already in Place …

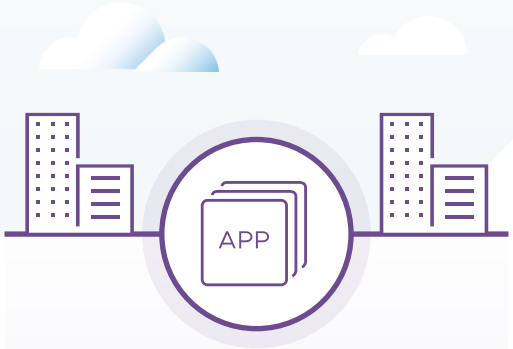
Significant changes from vRAM license deployments and features to core-based VCF licensing



Most efficient deployment of VCF license on existing platform



Maximise licensing footprint to accommodate near-term growth

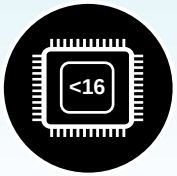


Best-design practice for VCF9.x architecture for new platforms

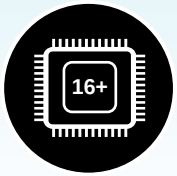
Optimization: Host & Core

Optimizing Your Licensing Usage & Consumption

Most common host infrastructure challenges for CSPs



Hosts w/ <16-pCores



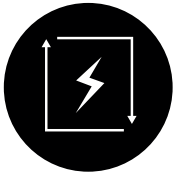
Hosts w/ Excessive Cores

Unbalanced vCPU to pCore

Unbalanced Hosts

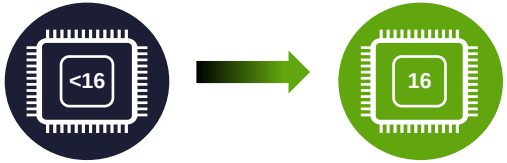
Shift from vRAM to Core

Excessive Spare Hosts



Idle DR Sites

VCF Host CPUs with <16 pCores



The Challenge

- VCF license applies a minimum of 16-pCores per CPU
- Older or legacy CPUs with 4-/8-/12-pCores will now be charged at the minimum rate of 16-pCores per CPU
- Artificially charging for pCores that are not physically present, driving up license costs and commit requirements

Optimization Approach

- Audit hosts to capture the distribution of pCores per CPU
- Retire hosts with <16-pCores and consolidate workloads onto hosts with higher pCore-counts to ensure the most efficient availability of CPU infrastructure and resulting allocation of licensing requirements
- Some workload requirements have specific pCore requirements for <16-pCore CPUs (for example: database hosts), and for these you need to calculate which is the better benefit – lower cores for DB licensing, for example, vs minimum VCF requirements

Low / Unbalanced vCPU to pCore Contention

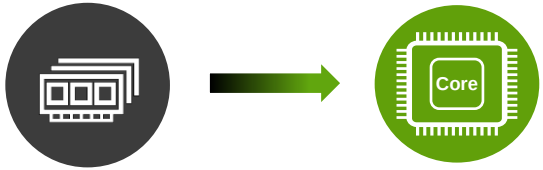
The Challenge

- Artificially increased VCF licensing costs due to inefficient use of pCores
- Mix of different workloads (Test / Dev, Production, Performance) consolidated on a single cluster leading to inefficient and unbalanced utilization of pCores

Optimization Approach

- Audit hosts to capture the average cluster & host-level contention
- Evaluate the purpose of a cluster – Test / Dev Workloads may operate at an average contention of 8vCPU:1pCore, Production Workloads 4vCPU:1pCore and Performance Workloads at 2vCPU:1pCore
- Remove under-utilized hosts from the cluster and consolidate workloads onto fewer hosts to achieve desired ratio
- Evaluate the benefit of having dedicated clusters for specific workload requirements to ensure efficient use of pCores as well as better meeting of defined SLA requirements
- CPU readiness metric can be captured and presented to tenants via an Aria Ops Dashboard, improving demonstration of meeting a mature and advanced SLA metric

Shift from vRAM to Cores



The Challenge

– With the prior vRAM-based licensing model, CSPs have built offerings within their service catalogue using a 100% vRAM-based cost model and chargeback pricing

Optimization Approach

– Evaluate the existing service catalogue and re-design / re-architect / re-define as required, recognizing that consumed pCores is now the driving element in the software licensing component rather than consumed vRAM

– Changes in service catalogues may be required:

  – *With dedicated environments, charging on an entire physical host / cluster may be the best approach (including spares), although a VM-based service catalogue is certainly still feasible;*

  – *For shared environments, a VM-based service catalogue needs to be re-calculated with VM design focus shifted from vRAM to vCPU and the level of contention and sparing in the environment*

Excessive Spare VCF Hosts

The Challenge

– CSPs are now limited in maintaining adequate spare host capacity due to the change from vRAM to Core based licensing

– Additional VCF licensing requirements further restrict spare host capacity:

1. Any host within a cluster that has an active VM (of any size) will be charged for the duration that the VM is active
2. Any host that is deployed as an active vSAN node is chargeable (even if it does not have an active VM operating on it)

Optimization Approach

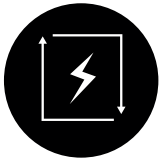
– Evaluate spare host capacity on a per cluster basis and reduce where practical (whilst maintaining SLA commitments)

1. Example: effectively n+3 host spares are being maintained and only n+1 is required, remove 2 active hosts from the cluster to ensure that active VMs do not float across all n+3 active hosts in the cluster when that additional capacity is not required

– Activate real-time and transparent capacity planning with Aria Operations to optimize spare host capacity

– Re-size per host vSAN requirements to reduce host count to achieve optimal density and sparing as required

Idle DR Sites With VCF Hosts



The Challenge

- Under-utilized hosts at a DR site were previously charged only for the consumed vRAM
- Per-host DR appliance (or proxy VM) causes an entire host to be charged for the duration of the month that the VM is running
- Hosts in an active vSAN cluster are always charged (even without active workloads)

Optimization Approach

- Under the VCF license construct, hosts without an active (powered on) workload will not be charged
- Examine RTO/RPO requirements to ensure only the minimum active hosts necessary to achieve SLAs are activated and that the service is adequately charged to the tenant
- Where applicable, re-architect DR solutions to best map to efficient allocation of licensed resources (e.g. utilisation of VLR / VCDA)
- Maintain minimum number of active hosts in a vSAN cluster and spares in maintenance mode, ensuring rebuild time when spares are activated meets the defined SLA requirements
- Where application, during a DR event, activated spares attract pro-rated charging, and at overage rates (on-demand)

Optimization: Networking

Optimizing Your Licensing Usage & Consumption

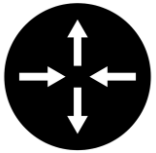
Most common network infrastructure challenges for CSPs

NSX Edition / Feature Complexity

Firewall Licensing Scalability

Load-Balancer Licensing Scalability

NSX Edition / Feature Complexity



The Challenge

- Prior NSX product packaging required CSPs to consume from a broad portfolio of different NSX product editions with different features and capabilities
- This created product and pricing complexities for CSPs to deliver capabilities within their service offerings that scaled well and catered to per-tenant requirements

Optimization Approach

- CSPs can now utilize all switching, routing and basic firewall features and capabilities of VCF Networking (NSX) under a single product and pricing model. This includes but not limited to:
  - Switching / NAT
  - IPv4 Static & Dynamic Routing
  - IPv6 Static & Dynamic Routing
  - ECMP
  - VRF Tier-0 Gateway
  - Ethernet VPN
  - L2 & L3 VPN
  - Multi-vCenter Networking & Security
  - Federation
- CSPs can also consume Aria Operation for Network Monitoring and HCX Enterprise to drive additional value and capabilities for their customers and increase revenue and profitability

Firewall Licensing Scalability

The Challenge

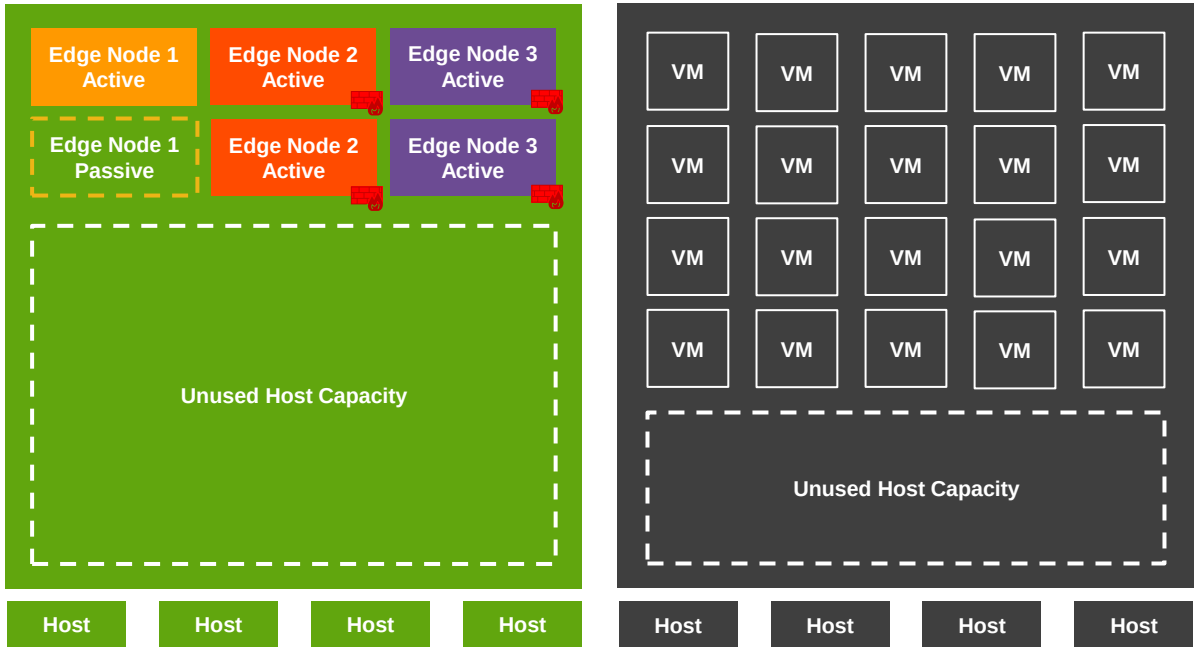
- Historically, NSX Advanced Firewall features (eg. DFW, GFW, ATP for DFW & GFW) could be licensed within a cluster at a far more granular level, providing CSPs better flexibility in managing licensing costs on a per-tenant basis, vs all-or-nothing
- The new ANS product packaging requires licensing across an entire cluster with all cores in the cluster licensed for these advanced features. This minimizes flexibility for CSPs who deploy shared-infrastructure where per-tenant granularity is critical, thus causing significant increase in licensing costs

Optimization Approach

- Evaluate which network security features are required on a per-tenant basis, and migrate tenant workloads to clusters with appropriately licensed features
- Determine what features or how much FW licensing functionality is required
- Deploy dedicated clusters for the specific level of functionality required to enhance flexibility in providing advanced capabilities on a per-tenant basis:
    1. Cluster dedicated to base NSX features only (included in standard VCF license)
    2. Separate cluster dedicated to workloads requiring vDefend features
    3. Separate cluster dedicated to workloads requiring vDefend ATP features (such as IDS/IPS)

vDefend Firewall Cost Optimization

Example #1: Dedicated Cluster for Edge Nodes



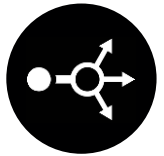
VCF Edge Cluster

VCF Workload Cluster

Total Licensing Cost: **$104,960**

- 8 VCF Hosts w/ 32 cores each
  - 8 x 32 = 256 VCF core licenses
  - 256 x $350 = $89,600
- 6 Edge Node VMs w/ 8 vCPU each
  - 2 A/P Edge Nodes (no security configuration)
  - 4 A/A Edge Nodes (licensed with vDefend GFW)
  - 4GW x 8vCPU x 4FW cores = 128 FW core licenses
  - 128 x $120 = $15,360

Load-Balancer Licensing Scalability



The Challenge

- CSP environments scale exponentially faster than enterprise customer environments due to the “service provider” business model where CSPs are operating, managing and delivering infrastructure and services to hundreds or thousands of customers (tenants).
- This exponential scale can create significant increases in licensing costs when leveraging a 1:1 deployment model for Avi Load-Balancer (e.g. 1 appliance per customer / tenant)

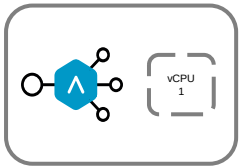
Optimization Approach

- CSPs can leverage a “shared” design model for deploying Service Engines to help reduce exponential increases in licensing costs
- Shared design model offers options for **Active / Standby** or **Active / Active** deployment designs, as well as a new **Bandwidth-based Charging Model** becoming available. This provides CSPs with flexibility to meet different customer (tenant) requirements while maintaining optimal license costs

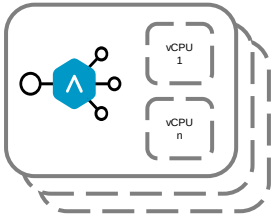
Pricing Options

Per Year List Price (US$)

Dedicated - $11,390

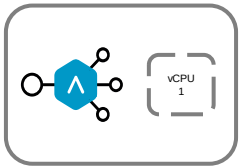


1 vCPU = 1 Service Unit



n vCPUs = n Service Units

Shared - $1265



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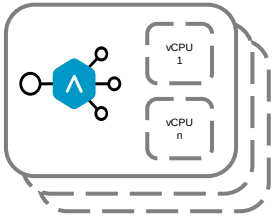


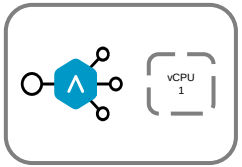
n vCPUs = n Service Units

One Service Engine can have 9 tenants
9 vNICs per SE

New packaging option …

Shared with Bandwidth Limits

200Mbps - $442 (5 cents per hour)
25Mbps - $252 (3 cents per hour)



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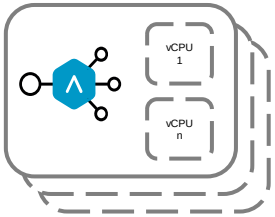


n vCPUs = n Service Units

Single Tenant can be 200 or 25Mbps

Avi Load Balancer Licensing Optimization Example

Sizing / Pricing for variable LB utilization - Dedicated vs Shared

Right-sizing (2,700 SU) vs. 1-size-fits-all (3,600 SU)

Dedicated

# of Tenants	Dedicated Model (A/S SE-Group per tenant)	Total SU
630 - Low Perf (70%)	1260	1260 SU
180 - Medium Perf (20%)	360	720 SU
90 - High Perf (10%)	180	720 SU
	Total (List)	**$15,376,500**

Performance	SU per SE
Low	1
Medium	2
High	4

Shared

# of Tenants	Shared Model 1 (A/S)	Service Units	Shared Model 2 N (1) + M (1)	Service Units	Shared Model 3 (Mixed 1/3rd A/S, 2/3rd N+M)	Service Units
900	L 630/9 *2 = 140 M 180/9 * 2 = 40 H 90/9 * 2 = 20 Total SE = 200	L 140 (140*1) + M 80(40*2) + H 80(20*4) Total SU = 300	L 630/9 + 25% = 88 M 180/9 + 25% = 25 H 90/9 + 25% = 13 Total SE = 126	L 88 (88*1) + M 50 (25*2) + H 52 (13*4) Total SU = 190	300(A/S) 600 (N+M) L 210/9*2=48 L 420/9 + 25%= 59 M 60/9*2 =14 M 120/9 +25% = 19 H 30/9*2 = 8 H 60/9 + 25% = 9 L 107 (48+59) , M 33 (14+19), H 17 (8+9) Total SE = 157	L 107 (107*1)+ M 66 (33*2) + H 68 (17*4) Total SU = 241
Total (List)	**$1,708,500**		**$1,082,050**		**$1,372,495**	

N+M Architecture vs. A/S HA

Network Infrastructure Optimizations

CSP guidance for optimal Application Connectivity, Security & Performance

VCF Networking

Increase utilization of new **included** features:

- Switching / NAT
- IPv4 Static & Dynamic Routing
- IPv6 Static & Dynamic Routing
- ECMP
- VRF Tier-0 Gateway
- Ethernet VPN
- L2 & L3 VPN
- Multi-vCenter Networking & Security
- Federation

Includes additional networking technologies:

- Aria Network Insight Enterprise
- HCX Enterprise

vDefend Firewall

Split Edge node clusters into firewall-enabled and non-firewall to optimize GFW charges

Right-size Edge node cluster that are firewall-enabled

Move bare-metal edge nodes to VM to avoid full VCF licensing per BM-host

Avi Load Balancer

Right-size Service Engines based on throughput requirements

Leverage N+M High-Availability mode that's available in ALB Enterprise and optimize use of spare Service Engines compared to Active-Standby HA

Utilize global or per-tenant auto-scaling with policy limits to deploy additional Service Engines only when required

Manage license allocation across the fleet by allowing controllers to pull licenses from Avipulse as needed

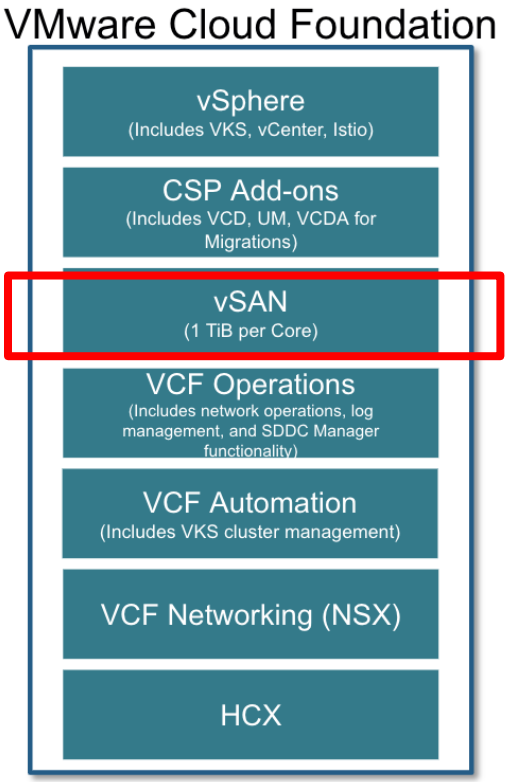
Optimization: Storage

vSAN is a Critical & High-value Component in VCF

vSAN Enterprise is now included in VCF

Retired VCPP Program

Complete Product List	Points / Month	Charged Per
Storage and Availability		
VMware vSAN Standard	0.02	GB per month for Used Capacity
VMware vSAN Advanced	0.03	GB per month for Used Capacity
VMware vSAN Enterprise	0.04	GB per month for Used Capacity



vSAN Add-on

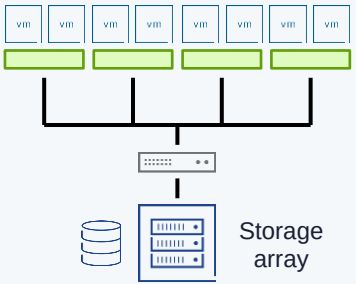
vSAN *Capacity* 1 TiB

vSAN vs Traditional Arrays

Remove hardware dependencies, decrease TCO and increase agility with vSAN

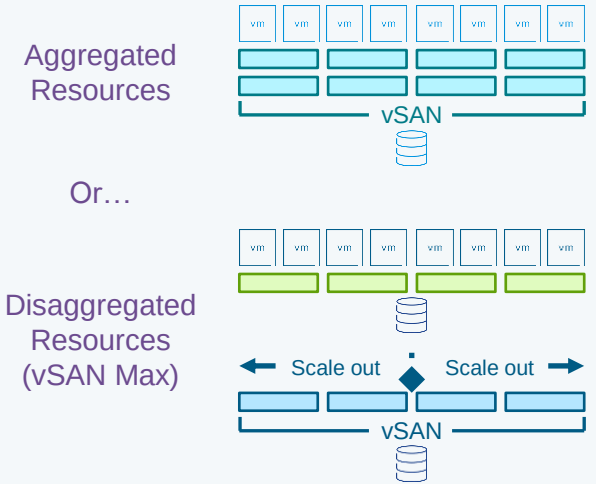
Legacy Three-Tier

- Proprietary storage hardware
- Limited scalability
- Siloed management
- Limited to Datacenter



Hyperconverged

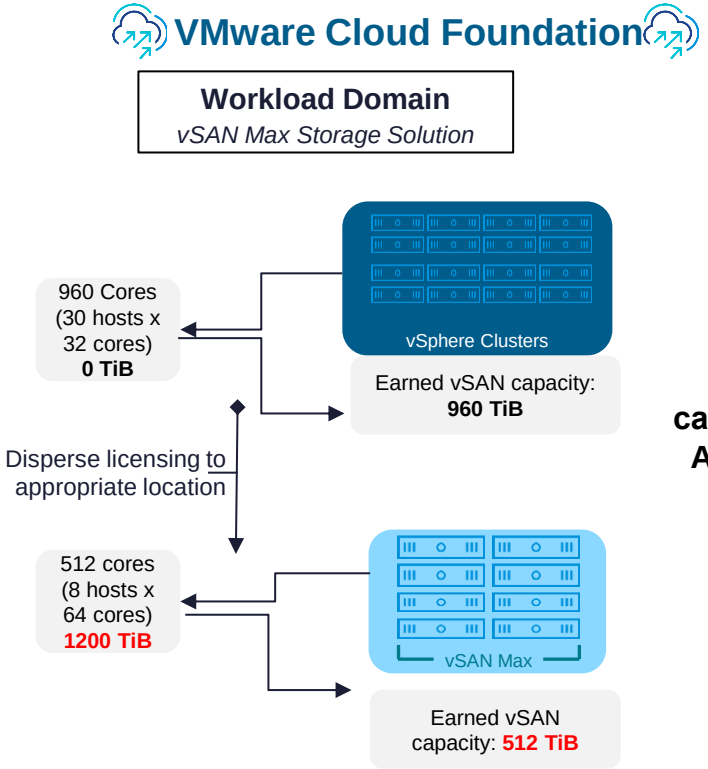
- Commodity server hardware
- Distributed scale-out storage
- Common management
- Datacenter or Edge



Available with VCF 5.2

VCF Storage Cluster (vSAN Max) licensing scenario

Example VCF Compute and vSAN Max cluster deployment



With spare capacity…No vSAN Add-on licensing required

Customer requirements

Workload clusters

- 10 x VCF Compute clusters - 3-nodes each
- 1 x vSAN Max Clusters - 8-node cluster
  - **1200 TiB** of raw storage
  - However earned = **512 TiB**

VCF License allocation

Total Storage Required: **1200 TiB**

- Capacity included with purchased VCF Cores: 960 + 512 = ~**1500 TiB**

vSAN capacity earned from licensing VCF Compute clusters aggregated with vSAN Max cluster.

Optimization: Take-aways

Key Take-Aways & Next Steps

- Reviewing your infrastructure for potential optimizations is an **important first step** in preparing your transition to VCF

- Take time to perform a thorough review across all key infrastructure areas including **host compute, networking, storage** and more…

- **Collaborate with your Business, Solution & Products teams** to understand where design or architecture changes may help drive cost optimizations to lower overall operating costs

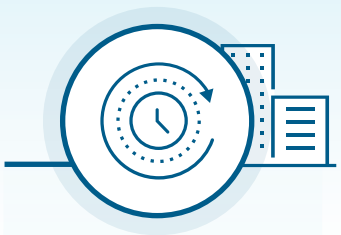
Key Take-Aways & Next Steps

Cost Planning & Optimisation

- VCF component optimization
- Maximize VCF consumption

Business & Offering Strategy

- Target customers
- Solution use cases for public and dedicated cloud

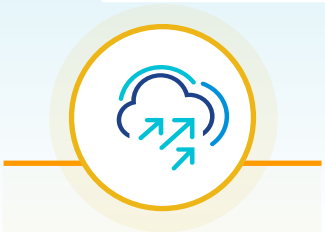


Managed Services Monetization

- GTM development
- MVP development
- Maximize cloud value
- Third-party take out
- Higher margin from higher value & differentiated services

BYoS Opportunity

- Target customers or industry verticals
- Optimized service offering
- Targeted use cases
- Accelerate adoption
- High value deployment & management skills



VCF Add-ons

- Consumption of full-stack VCF
- Productization and market penetration
- Revenue acceleration

License Portability

What is License Portability

How do end customers benefit form License Portability

Entitlement

License Portability is an entitlement offered to customers who have purchased the new VCF subscription offering (qualifying version purchased after December 13, 2023)

Investment Protection

Licensee

Customers continue to be the licensee of VCF and will have full control of their licenses and compliance requirements outlined in the VMware Cloud Foundation Specific Program Documentation (SPD).

Simplicity

Deploy

Deploy and utilize their VCF licenses across a range of compatible environments whether that's in their own data center, a hosting provider, a cloud service provider or a public cloud hyperscaler.

Flexibility

Why License Portability For VCSP

License Portability benefits to CSPs

End customer can continue to utilize the existing VCF purchase

End customer no longer needs to wait for subscriptions to end before migrating to CSP

CSPs can layer additional managed services onto customer's VCF cloud

License Portability Process for CSPs

How do CSPs get Certified for License Portability

To ensure partners offering VCF solutions are ready technically and operationally, a partner should review the License Portability Process Guide for Partners.

As part of the Self-Certification process, the License Portability Self-Certification Checklist must be completed.

License Portability Certification is granted when the Partner self-certifies that the infrastructure and managed services they are combining with VCF for a distinct integrated VCF offering meet the business requirements to run a full-stack VCF offering, and is thus eligible to support License Portability. See the Product Licensing Guide for details.

As part of the Self-Certification License Portability checklist via DocuSign, Partner should provide the offering description and details for License Portability eligible offering(s) to be published by Broadcom publicly.

Learn more about License Portability and eligible add-ons in the License Portability Policy

CSP Monetization with **VCF Managed Services**

Agenda

- Monetization Opportunity With VCF
- VCF Platform
- Storage Services
- Networking, Load Balancing & Security Services
- Kubernetes Services
- Cloud & Network Monitoring
- Sovereign Cloud
- Partner Enablement Services

Monetizable Services with VCF

Grow beyond IaaS to generate revenue with additional Managed Services

Storage Services

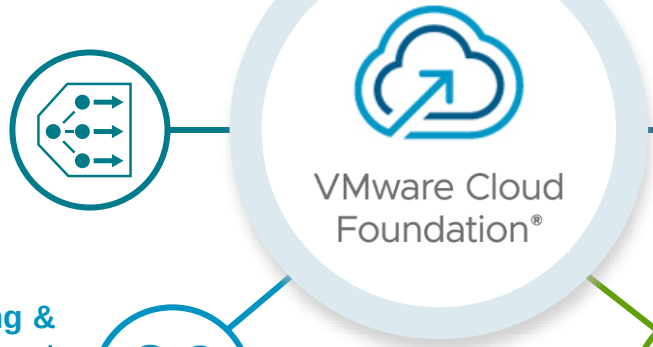
The foundation of app/dev with Block, File and Object vSAN storage services while protecting with Data Protection services

Data Services

Help your customers manage their data via database and Kafka based Data Services

Networking & Load-Balancing Services

Software Defined Networking delivers speed of service delivery, reduced risk and improved compliance



Security Services

Help increase business security awareness and reduce potential risk from ransomware, malware and lateral movements with advanced threat prevention services

Cloud Monitoring & Management

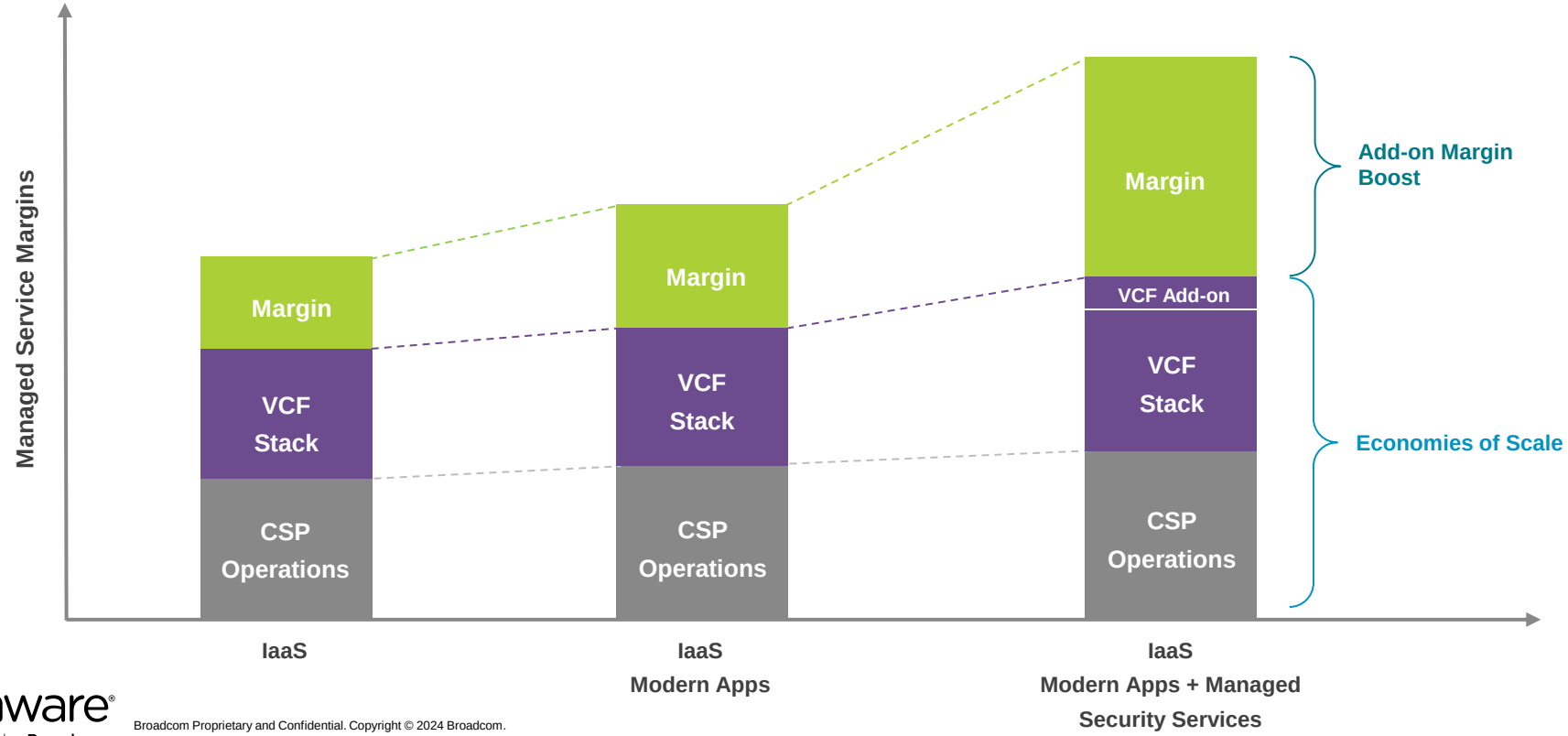
Monitoring and Automation services empower your customers to build their applications end ensure SLAs are being met

Kubernetes Services

Developer friendly Kubernetes services allows for faster application development and quicker time to market

VCF Economies of Scale Enable CSPs to Achieve Higher Margins

Integrated interoperable components lower CSP operating costs



VCF Solutions Accelerate CSPs GTM

Enabling our CSPs to deliver differentiated solutions to market

VCF Platform & LCM	VCF Compute	VCF Storage	VCF Networking & LB
Data Protection & DR	Migration	Containers	Data & Developer Services
Security	Cloud Management & Monitoring	Network Monitoring	Ecosystem
Sovereign Cloud	Private AI	Edge	VCF API & Orchestration

CSP Solutions

- Differentiated
- Vertically Aligned
- Professional & Managed Services

Your Journey to Monetization with VCF

Solution Kits help accelerate the Productization process

Market Trends & Demand

Technology, Service & Monetization Models

Architecture, Deployment & Onboarding Framework

Support, SLA & Lifecycle Operational Frameworks

Marketing, GTM & Sales Enablement

Time-to-Market (Productization)

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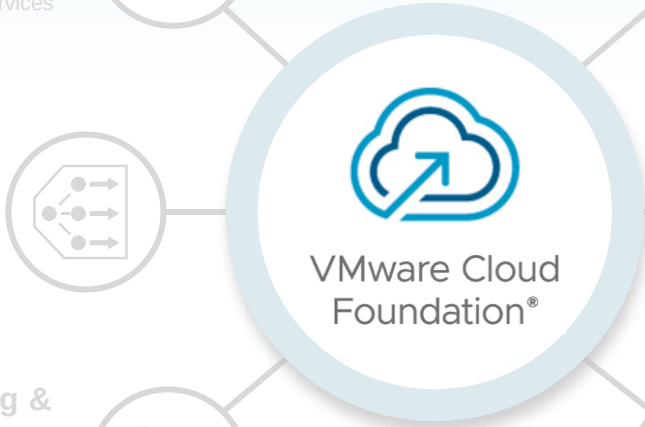

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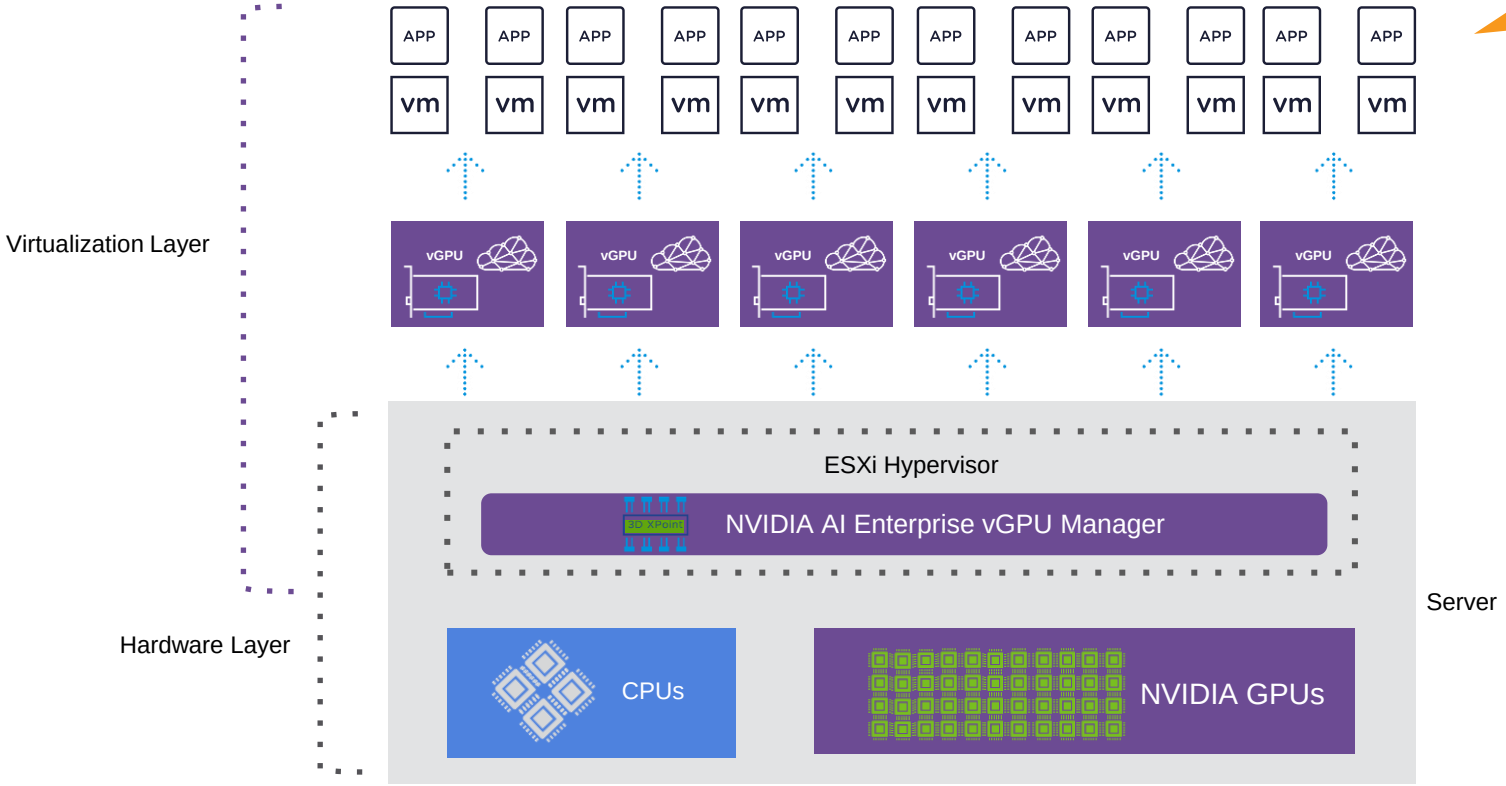
Solution Basics: GPU-aaS

Delivering General Purpose GPU with NVIDIA GPUs

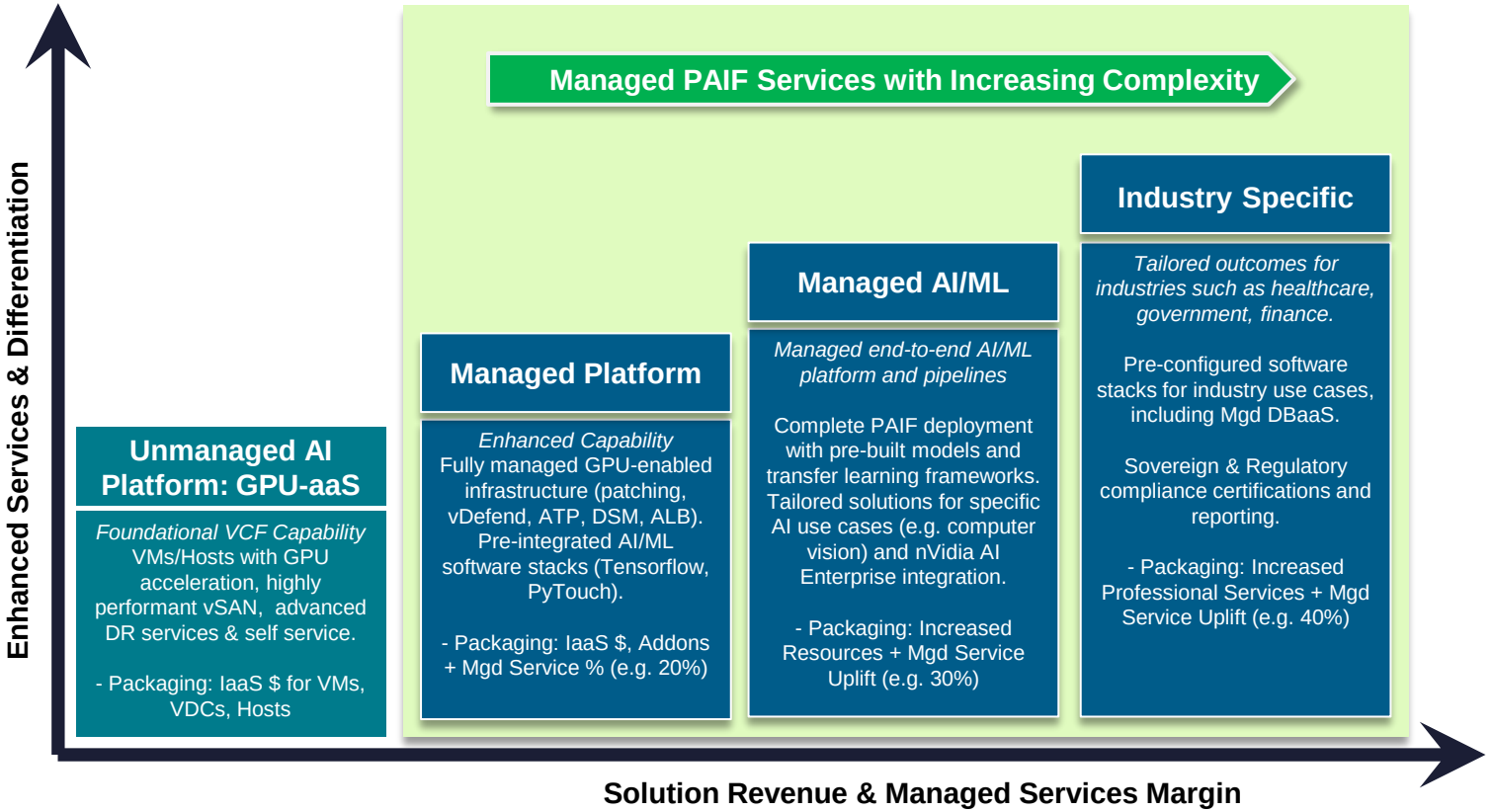
Available Today with VMware Cloud Director

Coming in VCF 9.x



CSPs Delivering a Comprehensive AI Capability

Maturing CSP Solutions to Drive Revenue and Deliver Differentiated Outcomes

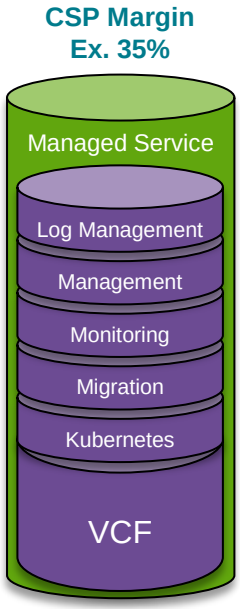


Service Based Strategy / Service Catalog

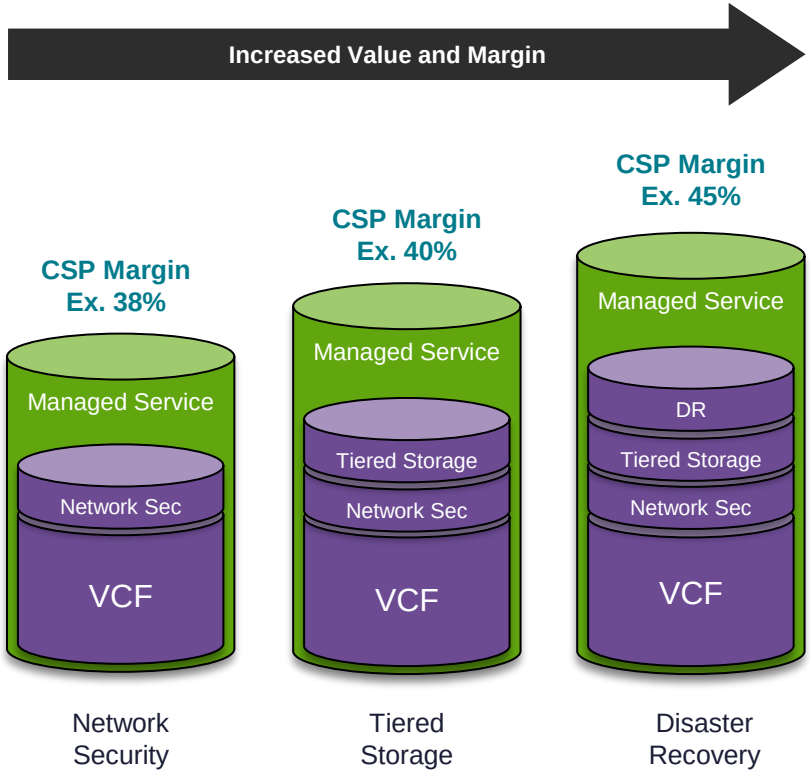
Creating recurring revenue streams

For this IaaS monetization strategy, the partner should focus on providing modular managed services packages that are aligned with the needs of the customers.

These are examples of some of the packages that the partner can offer.



VCF Base
IaaS + Additional values



Network Security

Tiered Storage

Disaster Recovery

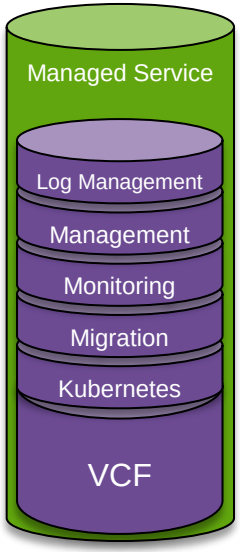
Up- and Cross-Sell Opportunities

Generate additional Revenue Streams

Solution-centric service catalogue rather vs Infrastructure-led

Increased Value and Margin

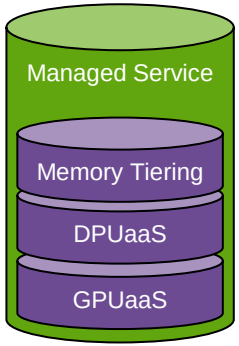
CSP Margin Ex. 35%



VCF Base

+ optional package

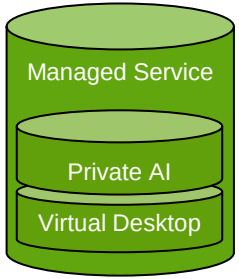
CSP Margin Ex. 40%



Additional Features

No VCF add ons required. Hardware updates might be required to support some functionality

CSP Margin Ex. 40%

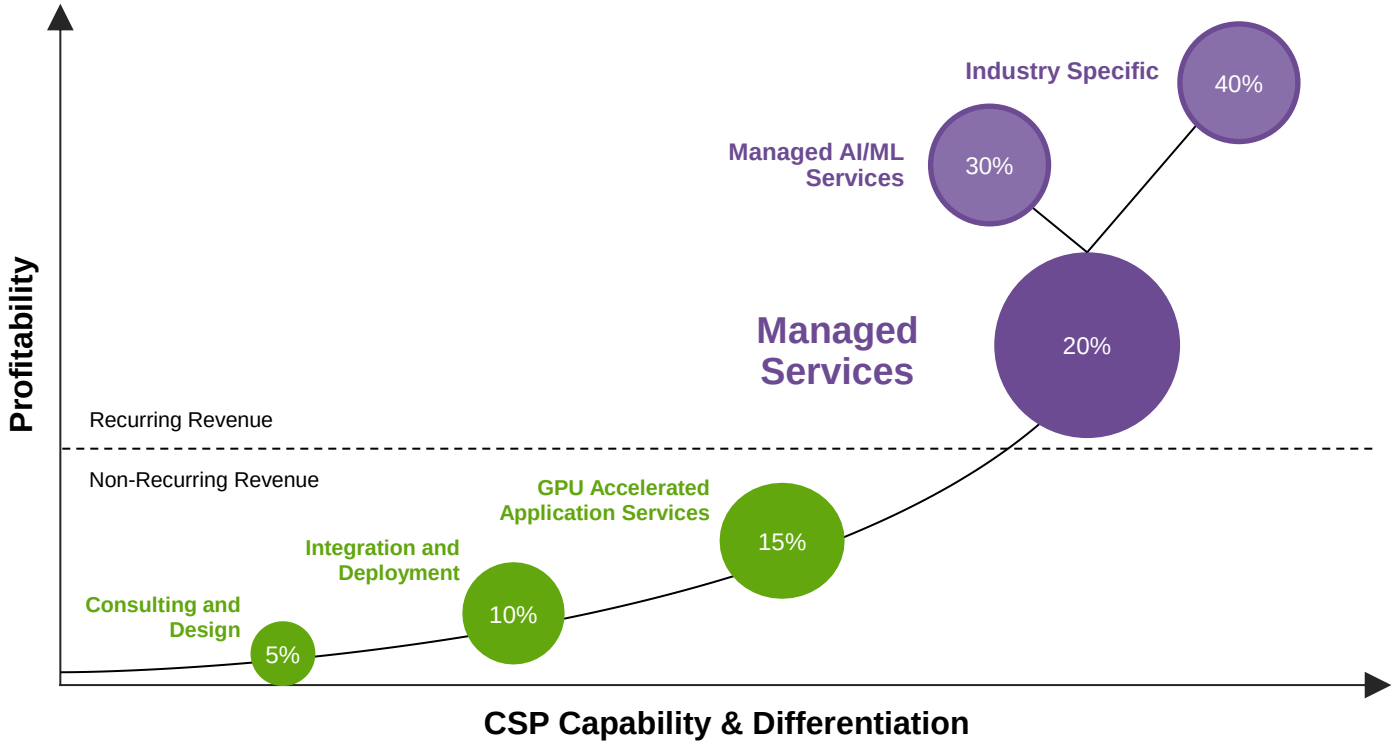


Advanced

These solutions require a mix of add ons and/or third-party licenses

GPUaaS & Services Sample Profitability Growth

Example Service Catalog



Non-Recurring Revenue

Consulting and Design: Assess customer requirements for GPU-accelerated workloads

Integration and Deployment Services: Integrate GPU infrastructure with VCF software stack

GPU-Accelerated Application Services: Optimize applications to leverage GPU acceleration on VCF

Managed Services: End-to-end lifecycle management of GPU infrastructure on VCF

Key

Revenue (TCV %) — **Service Offering**

How to Monetize & Deliver Industry GPUaaS Specific Packages

Example offerings tailored to a variety of unique workload requirements

Provides GPU acceleration for healthcare workloads like medical imaging, genomics, and drug discovery, enabling faster insights and breakthroughs while bolstering data privacy and compliance.

Can help accelerate financial workloads like risk analysis, fraud detection, and algorithmic trading by leveraging GPU power, while enabling secure multi-party computation and data sharing.

Can help accelerate manufacturing workloads like predictive maintenance, quality control, and digital twins, while providing confidential computing for protecting proprietary algorithms and data.

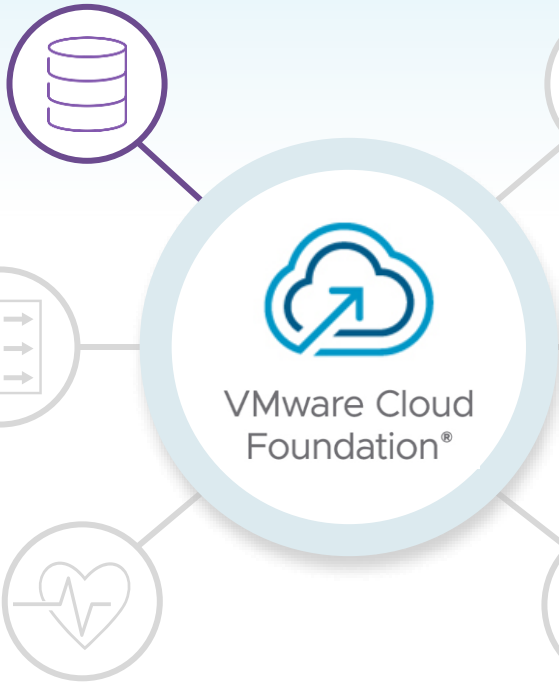
Subscription Based Licensing Model

Professional Services

AI-Ready Enterprise-Class Platform

Monetizable Services with VCF

Grow beyond IaaS to generate revenue with additional Managed Services



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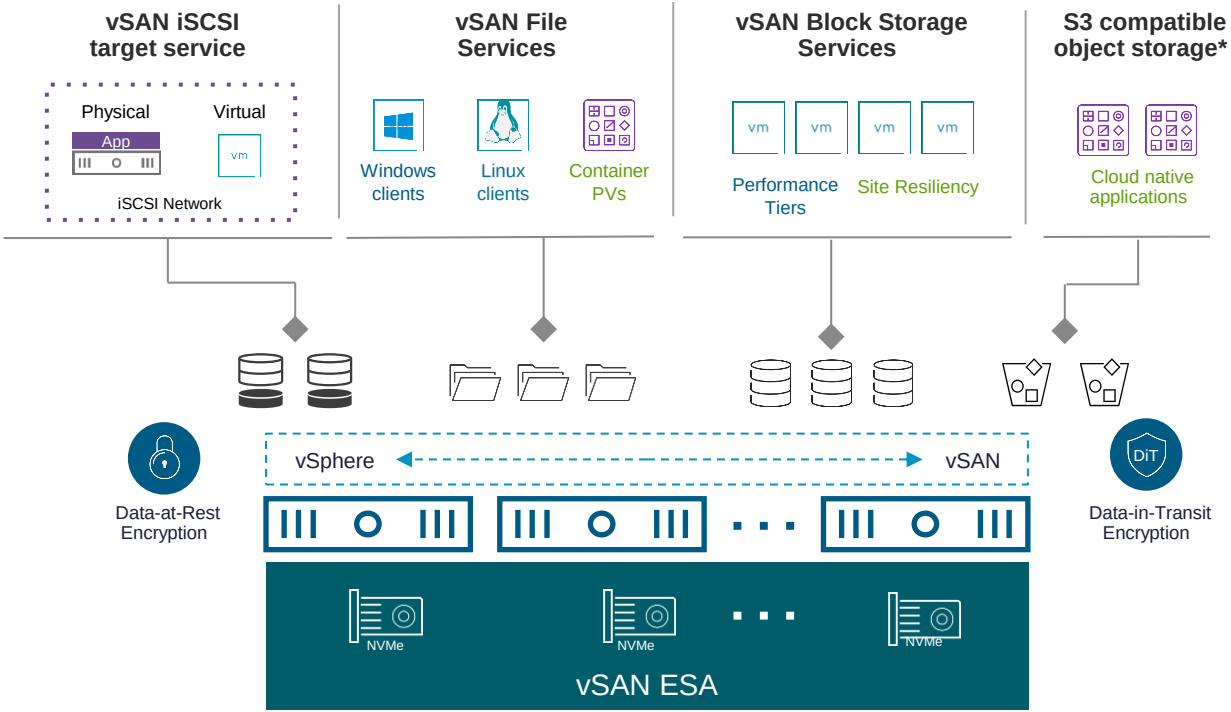
The Foundation for Storage-as-a-Service with VCF

High-performance Tiered Service Offerings for CSPs



Differentiate Storage Services:

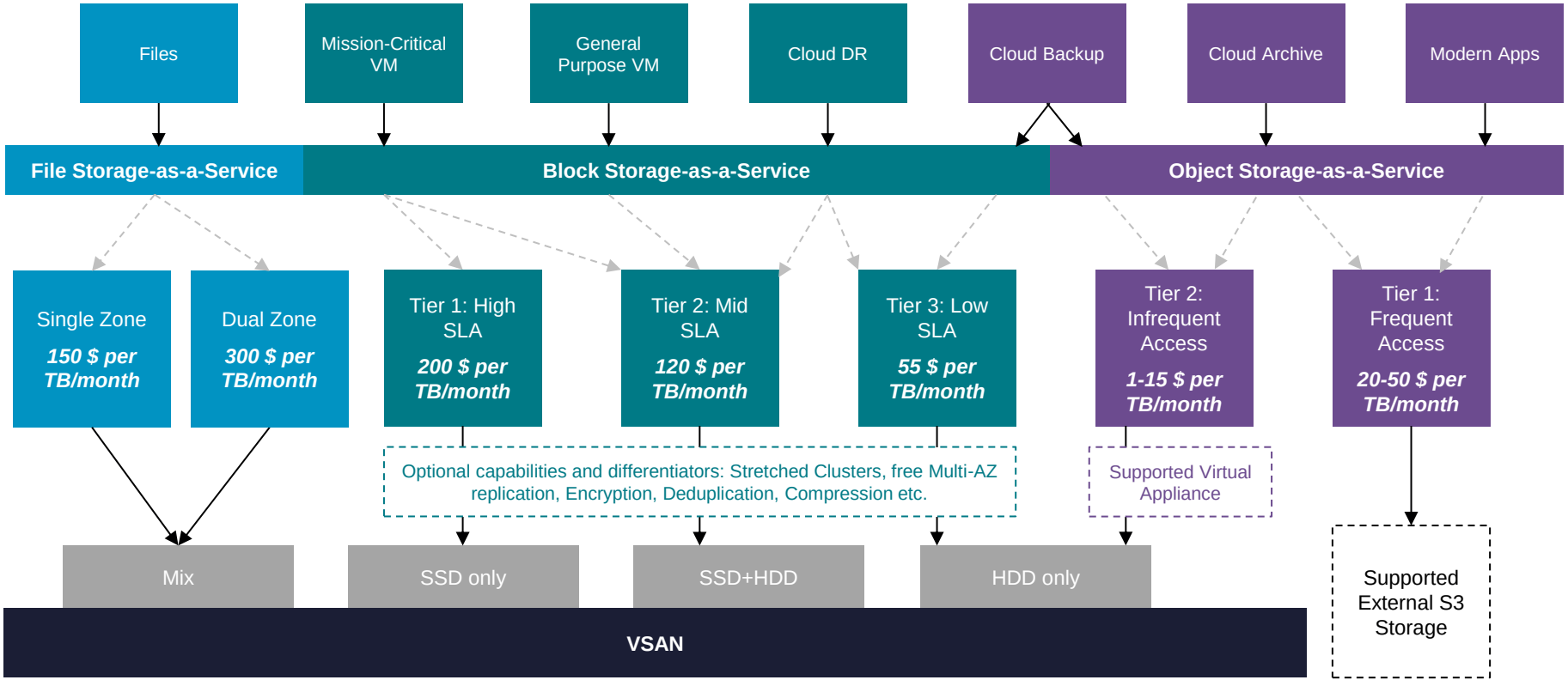
- Block storage at multiple performance tiers, resiliency levels and price points
- SMB and NFS file services
- iSCSI block access for legacy workloads
- S3 compatible object storage*
- Foundational vSAN capabilities meeting different workload requirements and at different price points

*When using a 3rd party certified solution through VMware vSAN Data Persistence platform

Address different Use-Cases with Service Tiers

Use-cases can drive pricing, costs and architecture

1 TiB per Core of vSAN Storage included in VCF



LEGO™ Blocks - vSAN Storage Components

Building Blocks: Compute + Storage Clusters

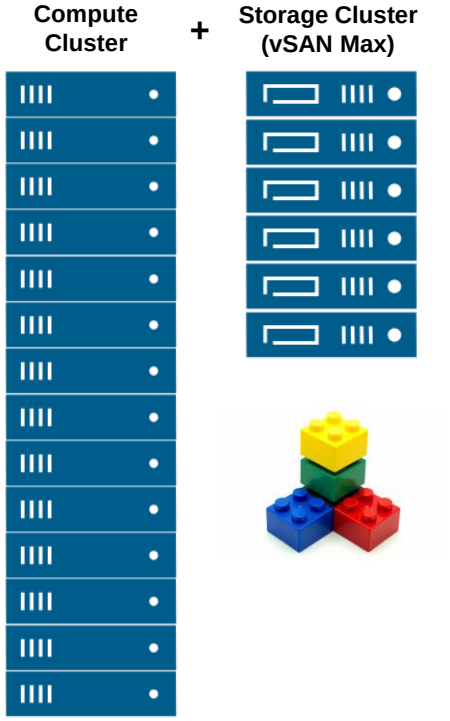
Compute cloud cluster utilising storage from dedicated vSAN MAX cluster

vSAN capacity of 1TiB per core included in base VCF license

Licensed vSAN consumption shared across clusters

Failure protection of RAID6 assumed

Compression conservatively estimated at 1.6



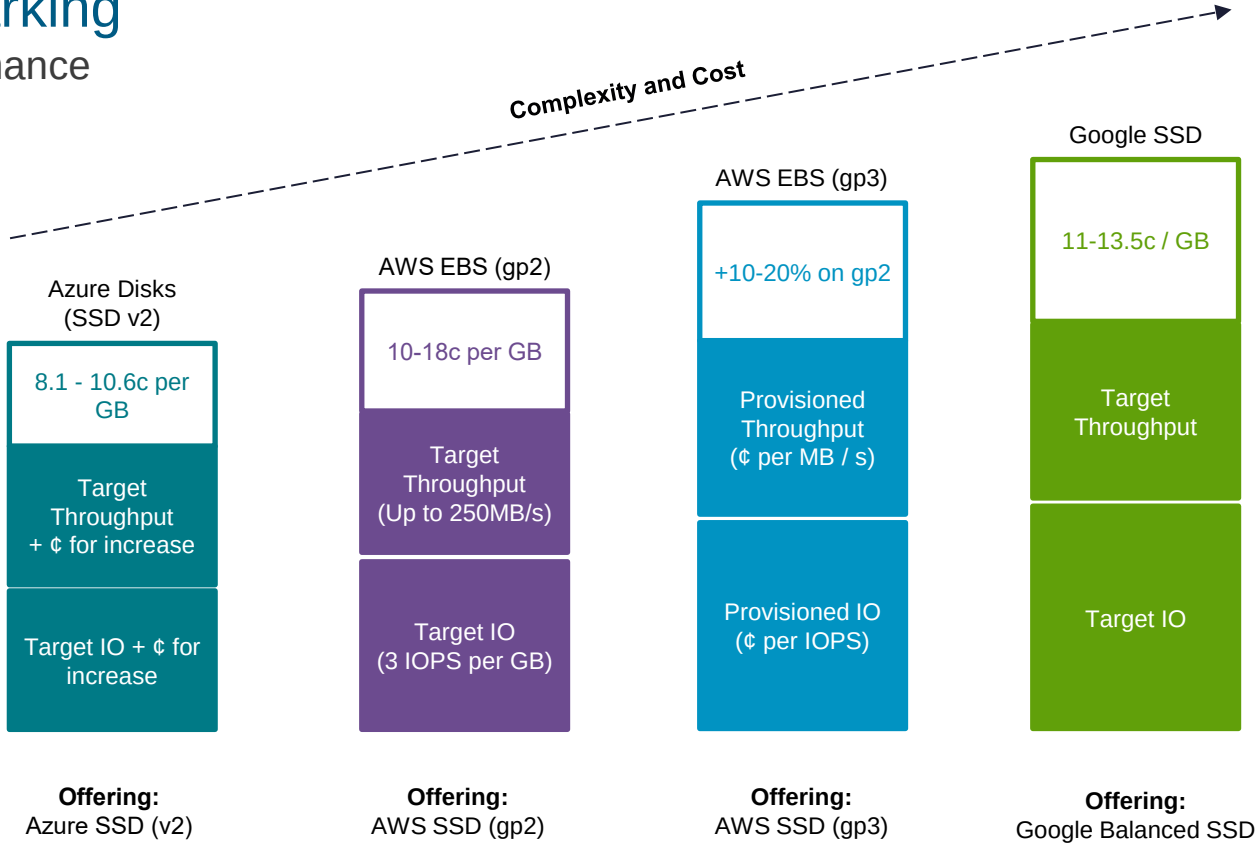
# Drives	6 hosts x 24 drives
Drive Capacity	3.84 TB (3.49 TiB)
Total Raw Capacity	553 TB (503 TiB)
Physical Cores	288 + 1,024 = 1,312
Useable Workload Capacity*	302.5 TiB*
vSAN Licensing	Fully licensed with VCF compute cluster
vSAN Headroom	~500TB spare
Average Cost (2.0x)	**6.4c per GiB / month**
Average Cost (1.6x)	**7.9c per GiB / month**

**** Useable Workload Capacity:*** *Overhead for vSAN operations, host rebuild, meta-data, vSAN and RAID removed; after compression.*

Storage Benchmarking

Consistency and Performance

- Differentiate with simplicity and consistency
- Detailed reporting & SLA/SLO capabilities
- High performance
- Hyperscalers can result in complexity and uncertainty
- Cost competitive
- Google SSD storage highest cost on average with less variation compared to Azure and AWS



**** Persistent Storage Costs:*** *As indiciated in AWS, Azure and Google Calculator & Pricing Tools*

Storage Benchmarking w/ TCO Analysis

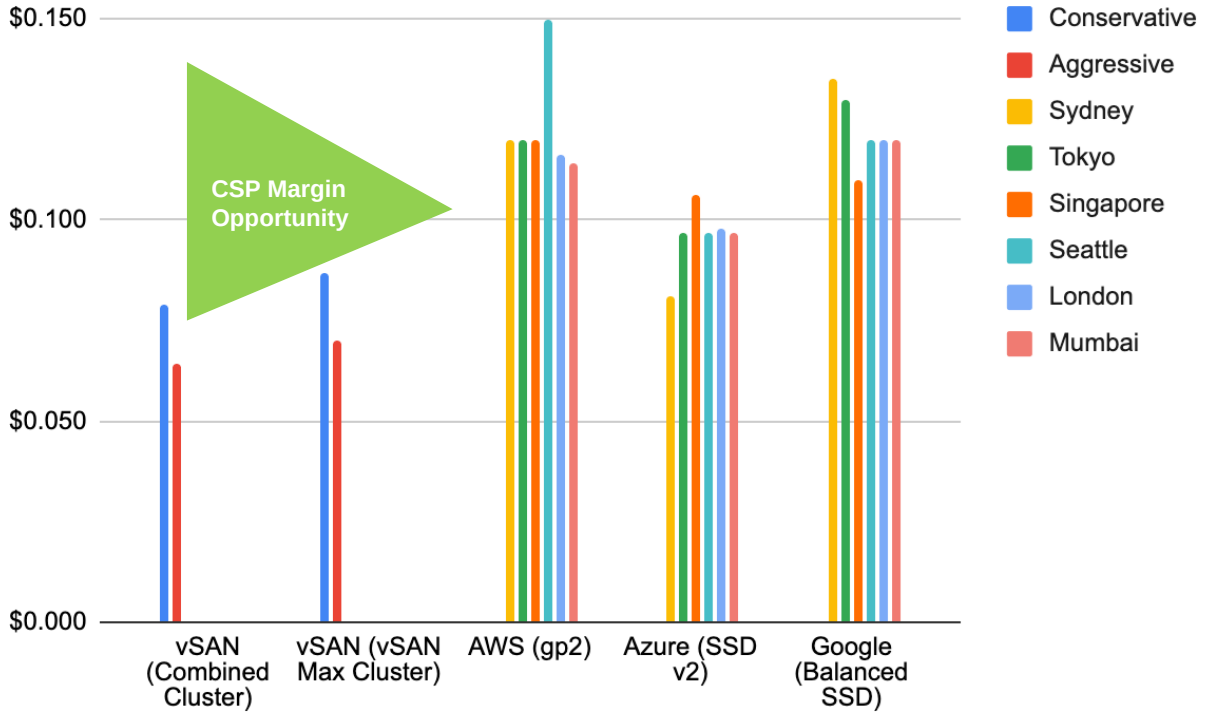
Consistency and Performance

vSAN TCO displayed with a combined Compute + vSAN Max Clusters & standalone vSAN Max cluster

vSAN compression shown at both “conservative” (1.6x) as well as “aggressive” (2.0x), where the higher value is expected for general cloud workloads

Significant variation on hyperscaler costs according to geo

Significant margin opportunity

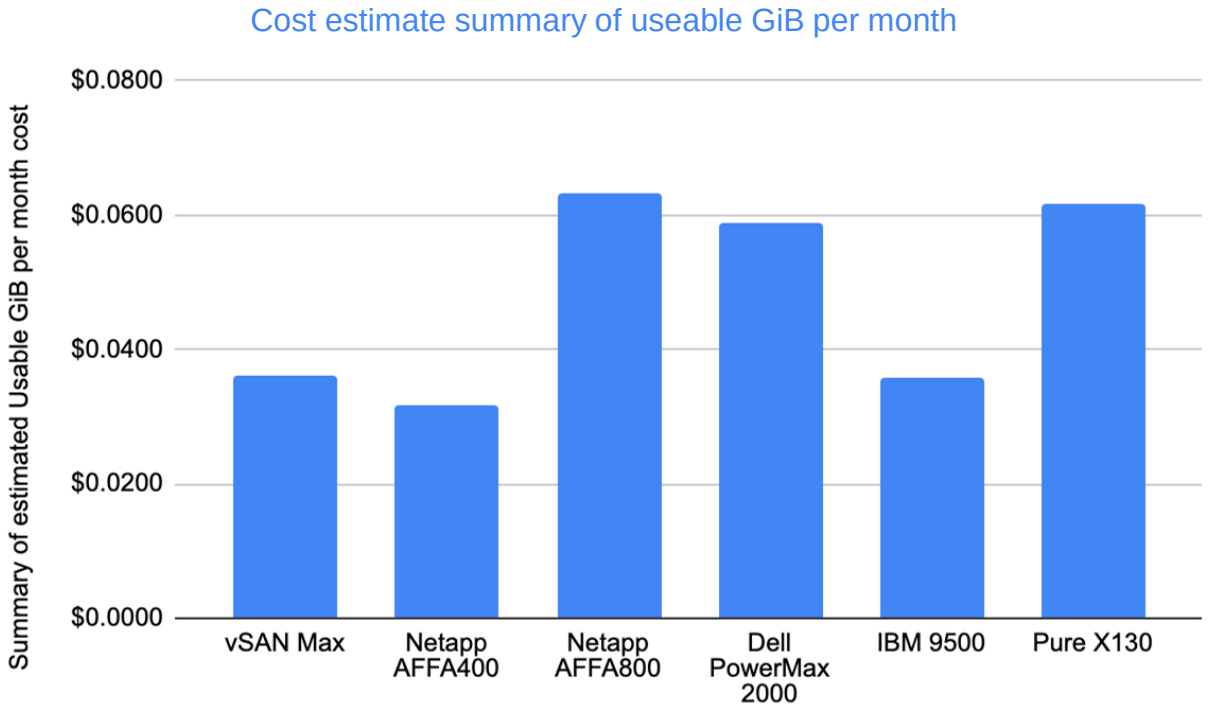


**** Persistent Storage Costs:*** *As indiciated in AWS, Azure and Google Calculator & Pricing Tools*

Storage Benchmarking w/ Standalone Storage Platform

Consistency and Performance

- Hardware + Software Licensing Costs Only
- Operational efficiencies, network efficiencies, … not applied (not a TCO analysis)
- vSAN Max shown to be cost competitive against dedicated storage arrays
- 1PiB sizing assumed



**** Storage Array Costs:*** *Based on IDC Storage Benchmarking May 2024, discounted platform charges*

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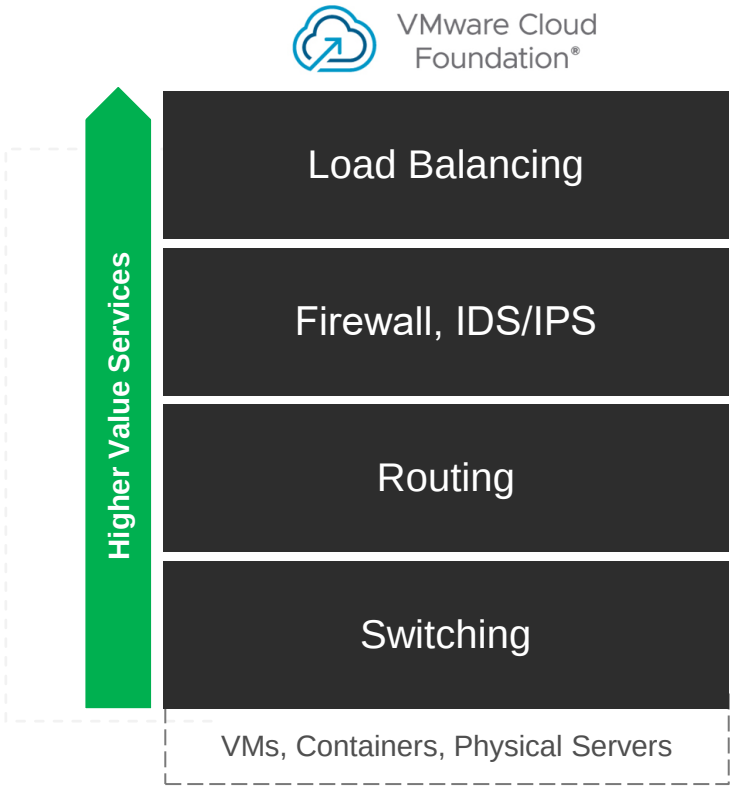
Monetizable Services **Add-Ons** with vDefend Firewall and Avi LB

Networking, Security and Load Balancing Services



VMware Avi Load Balancer Add-On

- L4 Load Balancing
- L7 Load Balancing
- Load Balancing Policies
- IPAM, DNS
- Global Server Load Balancing
- SSL / TLS
- Container Ingress
- Container LB
- App Health Analytics
- App Latency Analytics
- DDoS Protection
- Web Application Firewall (WAF)
- App Rate Limiting
- IP Reputation

VMware vDefend Advanced Threat Prevention (ATP) Add-On

- Distributed & Gateway IDS/IPS
- Network Traffic Analysis (NTA)
- Malware Prevention incl Sandboxing
- Network Det. & Response
- Gen AI Threat Investigation Co-pilot
- Curated Threat Intelligence feeds

VMware vDefend Firewall Add-On

- Distributed Firewall (L4-L7, Identity, FQDN, Malicious IP Filtering)
- Container Security
- Gateway Firewall (L4-L7, TLS Inspection, FQDN, URL Filtering)
- Security Intelligence (Visualization, Assessment, FW Rule recommendations)

NSX Networking for VCF

- Distributed Routing & Switching
- Overlay Networking
- Static & Dynamic Routing
- IPv4 & IPv6
- Virtual Routing & Forwarding
- EVPN
- Spoofguard
- L2/L3 Multicast
- NAT
- DNS & DHCP Relay
- L2/L3 VPN
- Quality of Service
- Container Networking
- Multi-Site Management
- IPFIX & Port Mirroring
- Object Tagging & Grouping
- Firewall Logging
- Stateless L3 Rules

Monetization Strategy for NSX

Charge based on VCF Add-Ons

Base charge for VCF NSX networking features

Add-On charges for vDefend Firewall

Add-On charges for Avi LB

Included in IaaS charge or as separately priced item

Less comparable to Hyperscale offerings

Offering:
Standard IaaS

3.5k per Node per month

Offering:
Standard IaaS + DFW

4k per Node per month

Offering:
Standard IaaS + DFW + GFW

4.5k per Node per month

Offering:
Standard IaaS + DFW + GFW + Avi LB

6k per Node per month

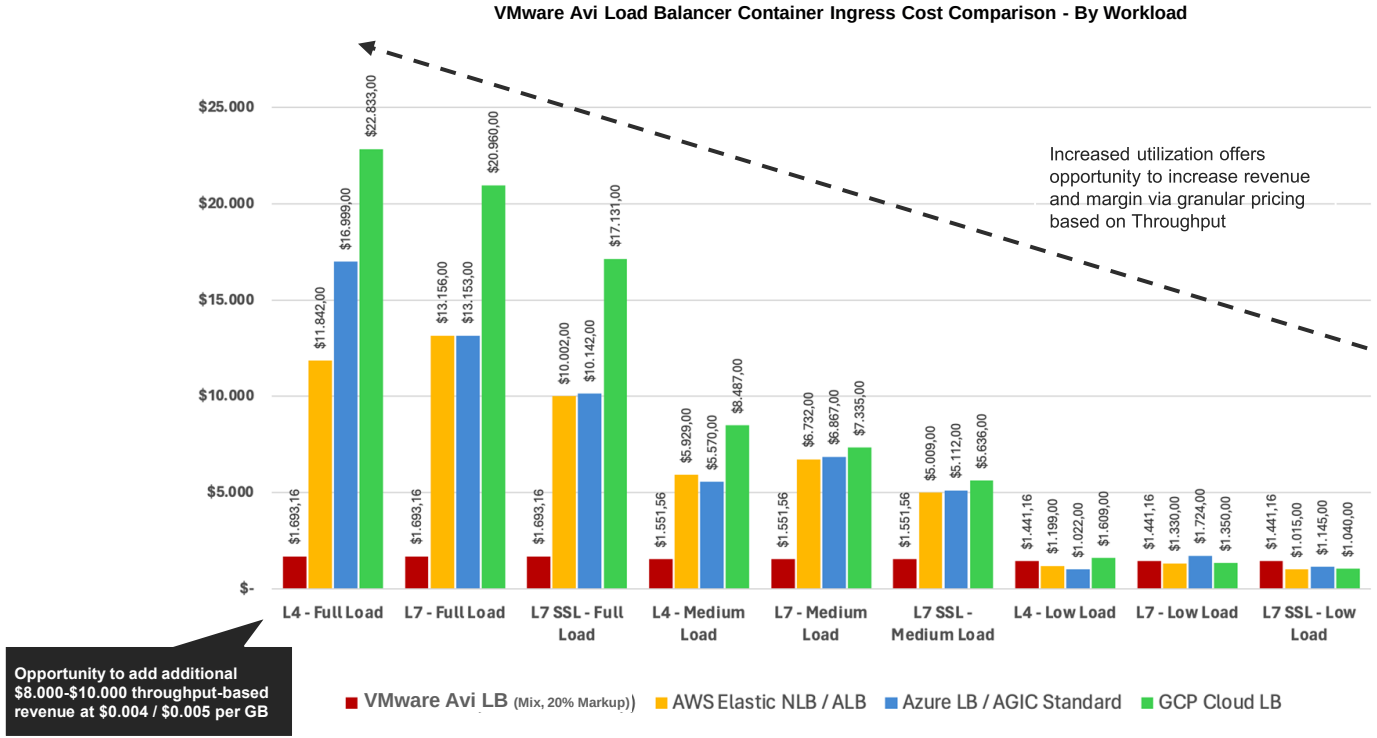
CSP Price Comparison and Margin Impact

CSP Solution using VCF + Avi Load Balancer vs. Hyperscaler Solutions

End customer price higher by a factor of up to **13.5x**

Conservative assumptions with only one LB instance, no egress traffic, no additional Load Capacity parameters

Room to optimize Avi LB costs with N+M, less disk performance, customer commit etc.

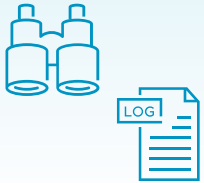


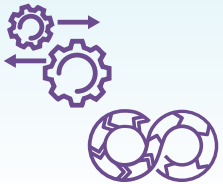
Monetizable Services with VCF

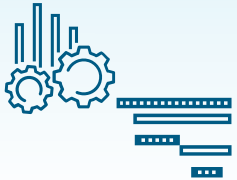
Grow beyond IaaS to generate revenue with additional Managed Services

Cloud Management Offerings

Build a complete portfolio of services with VCF Operations







Combine and integrate into a complete **Cloud Management Service Portfolio**

Monitoring as a Service

- Metrics, alarms, dashboards, reports
- Capacity planning, optimization and compliance
- System, App, Platform and Network
- Based on VMware Aria Operations
- Compete with AWS CloudWatch, Azure Monitor, GCP Cloud Monitoring

Logging as a Service

- Centralized Logging, Log Analysis, Dashboards
- Based on Aria Operations for Logs
- Compete with AWS CloudWatch Logs, Azure Monitor Logs, GCP Cloud Logging

Cloud Automation

- Cloud Automation and Orchestration
- IaC and GitOps Capabilities
- Service Catalog and Governance
- Based on Aria Automation
- Compete with AWS OpsWorks, CloudFormation, Azure Automation, GCP Deployment Manager

Full-Stack Observability

- Application, platform and infra observability
- Traces, events and dependencies
- Based on Aria Operations for Integrations
- Enhanced with Aria Ops for Apps*
- Compete with AWS CloudWatch, X-Ray, Azure Monitor, GCP Cloud Trace

For VMware Cloud Foundation, Public Clouds & Third-Party Components

*Aria Operations for Apps for a chargeable SaaS Add-On and not yet GA for CSPs

Easier Offering Portfolio compared to Hyperscalers

Example: Cloud Monitoring and Logging Services

Amazon Web Services

AWS CloudWatch Metrics
per metric, per API requested metric, per metric stream

AWS CloudWatch Logs
per GB data ingestion, per GB data storage, per GB data scanned, per GB vended logs

AWS CloudWatch Dashboards
per dashboard

AWS CloudWatch Alarms
per alarm metric, per metric analyzed, per composite alarm

AWS CloudWatch Events
per million custom event, per million cross-account event

AWS CloudWatch
Additional charging metrics for insights, network resources, canaries, etc.

Microsoft Azure

Azure Monitor Metrics
per metric query, per metric ingestion

Azure Monitor Logs
per GB basic logs, per GB analytics logs in tiers, per log search query, per GB archive, per export, per GB retention etc.

Azure Dashboards
Free

Azure Monitor Alert Rules
per alert

Azure Monitor Notifications
per update event, per E-mails, per push notification, per web hook, per SMS, per voice call

Azure Monitor
Additional charging metrics for web tests, analytics, Prometheus etc.

Google Cloud Platform

Google Cloud Monitoring
per metric, per API requested metric, per monitoring uptime checks

Google Cloud Logging
per GB data ingestion, per GB data storage

Google Cloud Trace
per trace ingestions

Error Reporting
Cloud Logging charge

Cloud Profiler
Free
.

Google Cloud Operations Suite
Varying charges for GKE, Prometheus, Anthos etc.

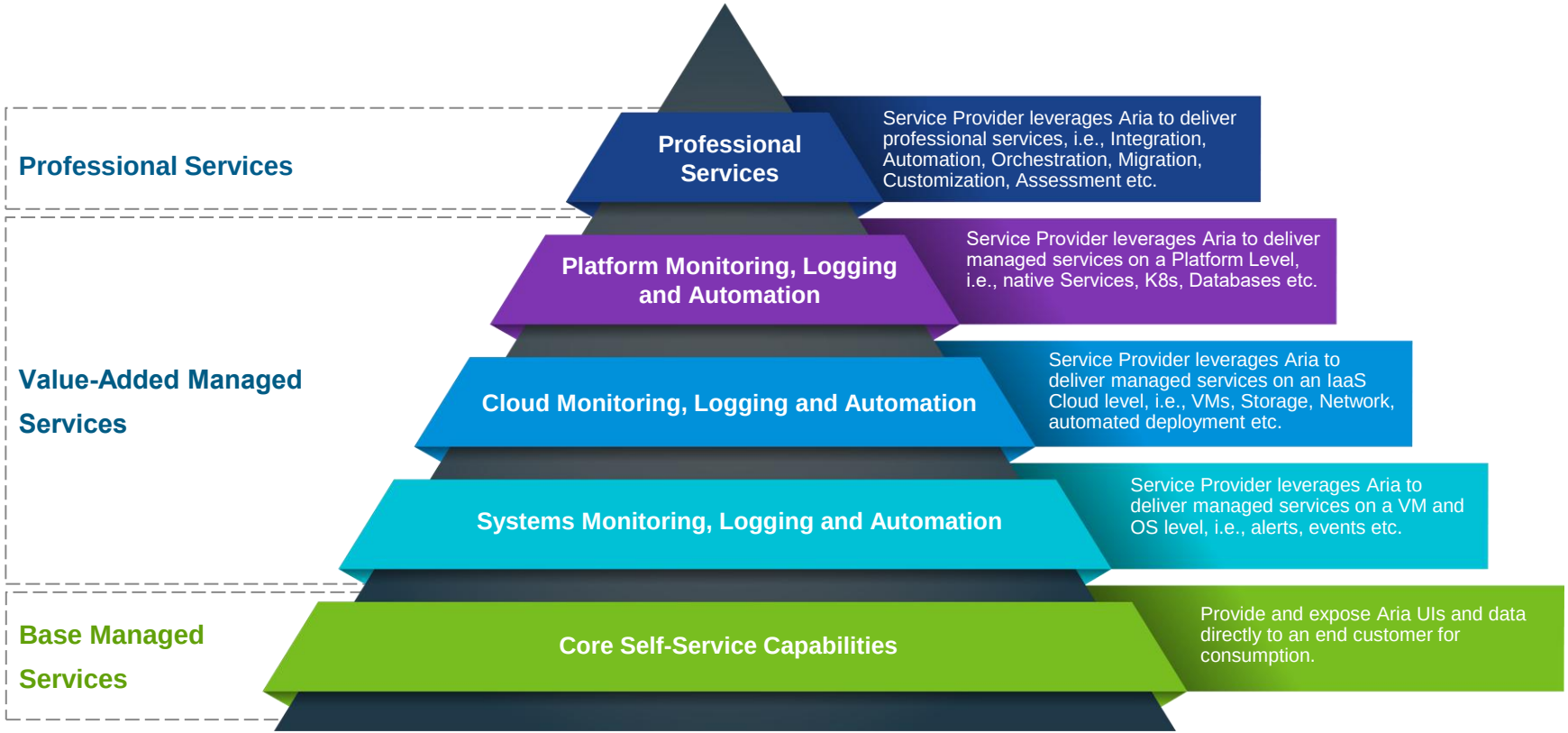
VMware Service Provider

VMware Cloud Foundation®

Aria Operations
Aria Operations for Logs
Aria Operations for Networks
Aria Operations for Integrations

Charging Models:
- per Aria Instance
- per Object / VM
- granular

Strategies for Monetizing VCF Operations



VCF Operations Pricing Models

VCF Ops Instance ($4k Cost): $10k Revenue	50k Objects at $2: $100k Revenue	$10M. Metrics at $0.3: $3M. Revenue

per Aria Instance

- Charge per Aria Instance
- Offer different instance sizes based on customer requirements
- Fixed charge with unlimited Objects, Metrics, Alarms, Dashboards, Reports etc.
- Chargeback via Aria Instance Tag
- High revenue and margin opportunity
- Differentiate from granular and unpredictable charges in AWS CloudWatch, Azure Monitor, GCP Operations Suite etc.

per Object / VM

- Charge per managed Object in Aria
- Object can be:
  - vCenter, Cluster, Host, VM
  - Data Store, vSwitch, Port Group
  - Folder, Resource Pool, Namespace
  - Public Cloud resource
  - OS, App and platform instance
  - Infrastructure object
  - Application adapters
- Chargeback via Object Tag where possible or custom query
- Good balance between granularity, complexity and margin

Granular

- Charge on a granular consumption basis
- For Example:
  - per Metric
  - per Alarm
  - per Dashboard
  - per Report
  - per GB Logs
  - per trace
- Chargeback via custom query
- Aligned with hyperscale PnP
- Low initial margin, huge revenue/margin potential at scale

TCO Comparison Example - VCF Operations

Significant Revenue and Margin Opportunity

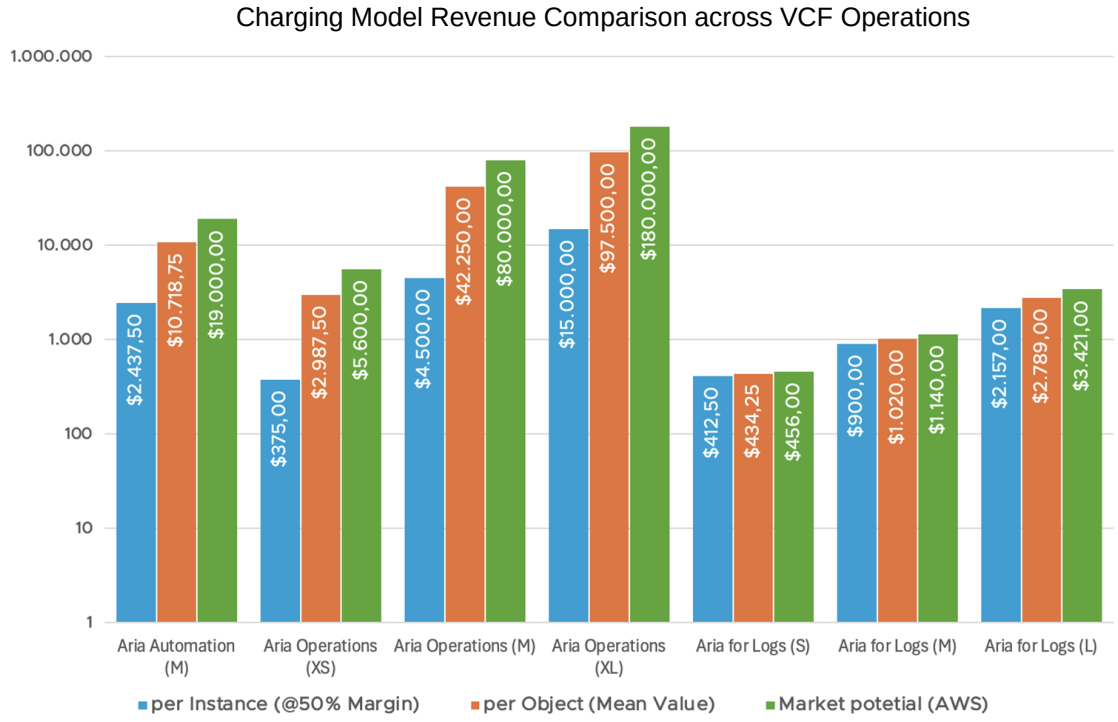
Per Instance model assumes IaaS VM Unit Sales Price plus 50% margin

Market potential based on AWS granular charging model

per Object model assumes mean value between the other two

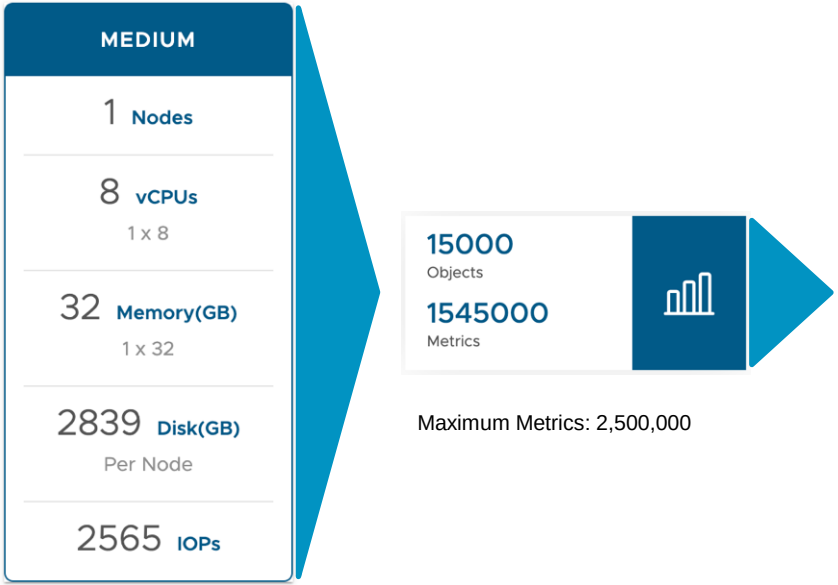
In general, per Object model is still considerable cheaper compared to former VCPP per OSI price at 38% CSP discount and 20% margin

(Note: Logarithmic scale)



TCO Comparison Example - VCF Operations

Significant Revenue and Margin Opportunity



Maximum Metrics: 2,500,000

Comparable AWS Costs

Tiered price for: 1,545,000 metrics
10,000 metrics x 0.30 USD = 3,000.00 USD
240,000 metrics x 0.10 USD = 24,000.00 USD
750,000 metrics x 0.05 USD = 37,500.00 USD
545,000 metrics x 0.02 USD = 10,900.00 USD
Total tier cost: 3,000.00 USD + 24,000.00 USD + 37,500.00 USD + 10,900.00 USD = 75,400.00 USD
CloudWatch Metrics cost (monthly): 75,400.00 USD

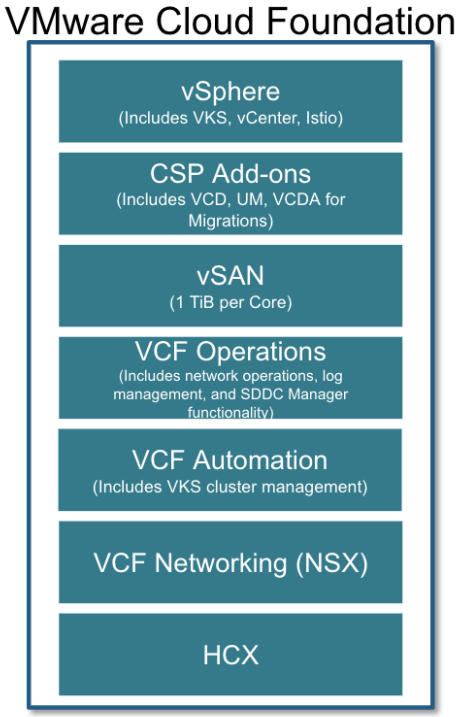
Tiered price for: 1,000 Dashboards
3 Dashboards x 0.00 USD = 0.00 USD
997 Dashboards x 3.00 USD = 2,991.00 USD
Total tier cost: 0.00 USD + 2,991.00 USD = 2,991.00 USD (Dashboards cost)
CloudWatch Dashboards and Alarms cost (monthly): 2,991.00 USD

Cost per VM: **1,200 USD**
2x (HA): **2,400 USD**
25% Margin: **3,000 USD**

26x Margin for Aria LCM, Managed Services and Profit

Potential Revenue: ***80,000 USD***

VCF – Putting **VCF Network Operations** (VRNI) to work ...

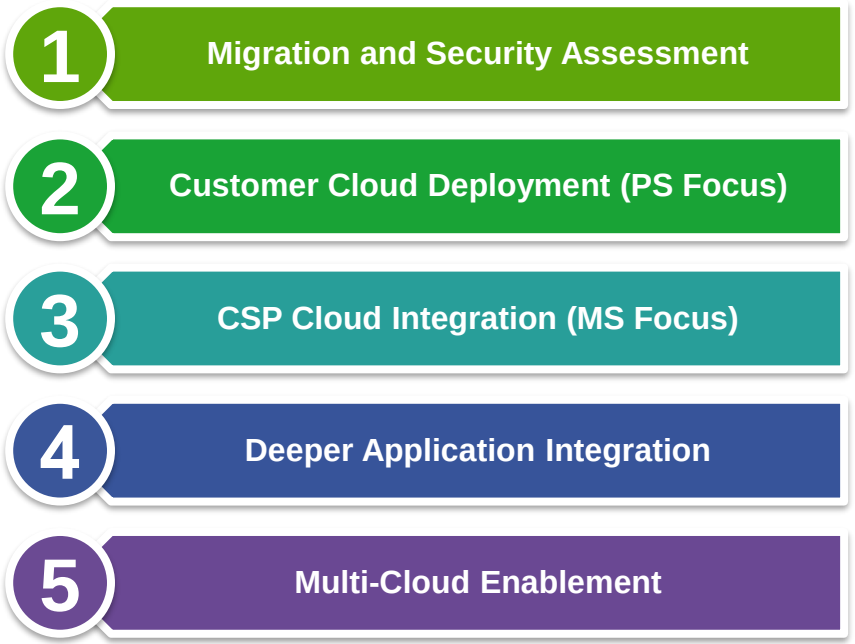


Networking Monitoring Opportunities

- Unlock further value (margin + revenue) across the VCF Deployment Models
- Professional Service opportunities in Private Cloud (on premise with the customer, in CSP DC or at the Edge)
- Ongoing Managed Service opportunities across Private and Public Clouds (CSP + Hyperscaler)
- Networking and Application Visibility
- Inclusive VCF license bundle

Service Implementation Highlights

Realizing Professional & Managed Services Opportunities with Customer Focus

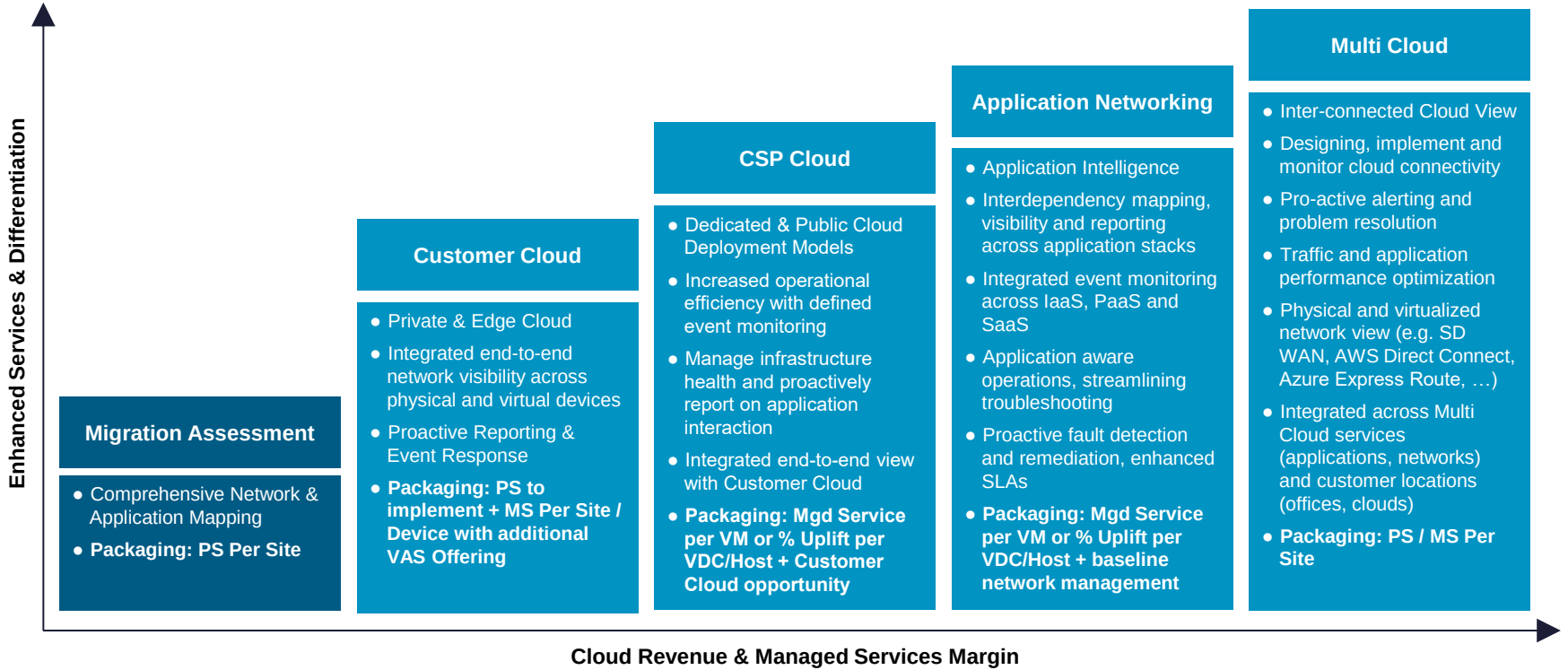


Target Customer

- Customers in a mature cloud maturity stage
- Customer that has complex cloud and network challenges and needs help from a CSP
- Customers looking to move to a OpEx model
- Customers retiring their data centers and increasingly moving to Cloud
- Customer wants to embark on digital transformation strategies
- Customers suffering Cloud pain due to sub-optimal network and application deployments

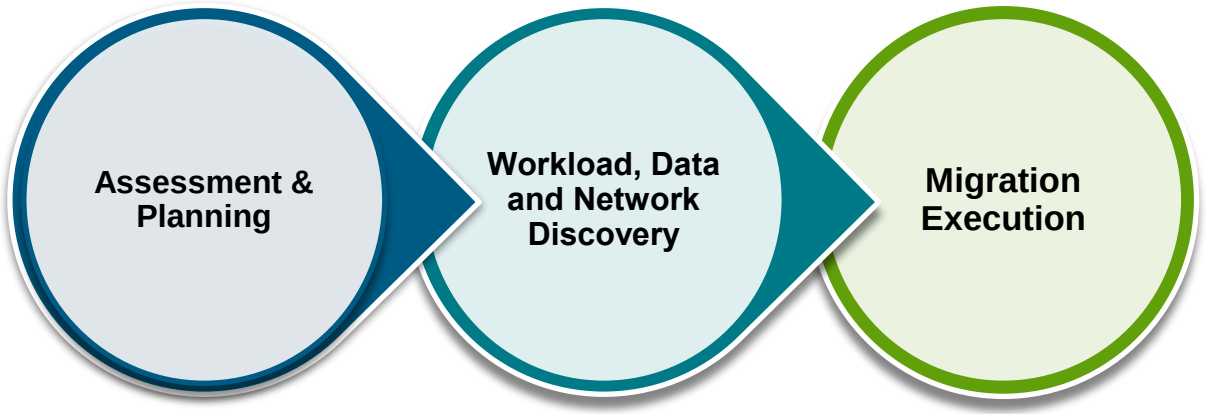
Delivering Comprehensive Network Monitoring Capabilities

Hybrid Cloud Professional Services + Managed Services Opportunities



Network Monitoring - Monetizing Pre-Migration Services

Deliver an end-to-end migration solution for private and public clouds



- App Migration Strategy
- Migration Planning
- Maintenance Planning
- Define Risks & Timeline
- Develop Toolset

- Application Discovery
- Dependency Mapping
- Business Criticality Model
- Data Classification

- Self service
- Managed service
- Large data set migration
- Warm/cold/live migration
- Testing and cutover

Monetizable Services with VCF

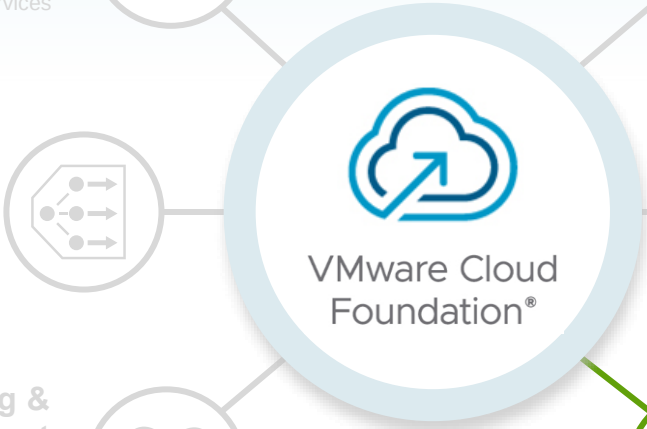
Grow beyond IaaS to generate revenue with additional Managed Services

Storage Services

The foundation of app/dev with Block, File and Object vSAN storage services while protecting with Data Protection services

Data Services

Help your customers manage their data via database and Kafka based Data Services



Networking & Load-Balancing Services

Software Defined Networking delivers speed of service delivery, reduced risk and improved compliance

Security Services

Help increase business security awareness and reduce potential risk from ransomware, malware and lateral movements with advanced threat prevention services

Cloud Monitoring & Management

Monitoring and Automation services empower your customers to build their applications end ensure SLAs are being met

Kubernetes Services

Developer friendly Kubernetes services allows for faster application development and quicker time to market

Kubernetes as a Service Offering Tiers

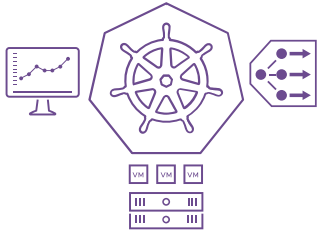
Bring Offerings to Market in phased Approach to align with internal Learning Curve

CSP self-service offering to capture Kubernetes and Developer workloads

Entry-Level Kubernetes

For Hosted and Managed Private Cloud:

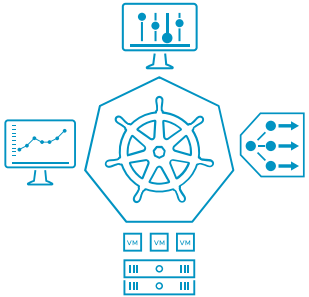
- **Easy Cluster Deployment**
- 99.9% Availability SLA, best effort
- Compete with VMC, hyperscale Compute services and low-tier Kubernetes services



Mid-Tier Kubernetes

For Managed Private and Public Clouds:

- Easy Cluster Deployment
- **Easy Cluster Lifecycle Management**
- **Enterprise Container Networking**
- **Choice of Kubernetes Management Tools**
- 99.95% Availability SLA, financially backed
- Compete with premium hyperscale Kubernetes services



High-End Kubernetes

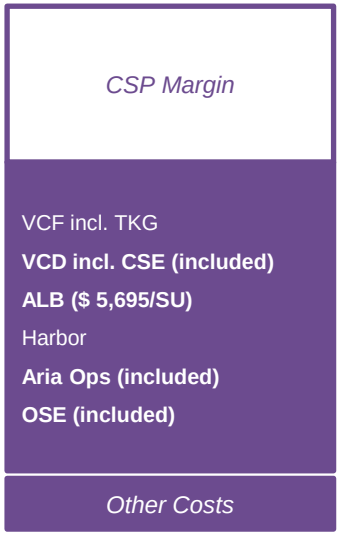
For all VCF Deployment Models:

- Easy Cluster Deployment
- Easy Cluster Lifecycle Management
- Enterprise Container Networking
- Choice of Kubernetes Management Tools
- **Multi-Cloud Management**
- **Advanced Policy Management**
- 99.95% Availability SLA, financially backed
- Compete with premium hyperscale Kubernetes services and Add-Ons

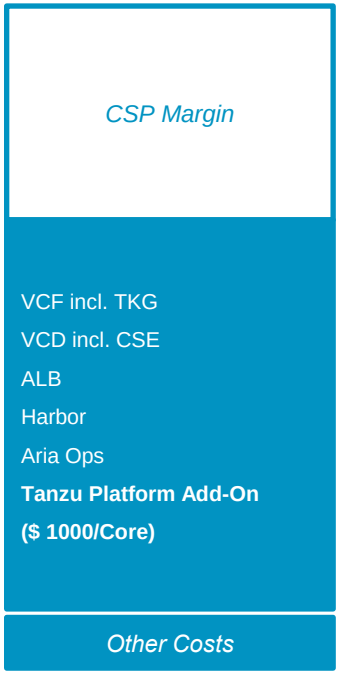
Kubernetes as a Service Offering Tiers (BoM)

Cost Planning & Margin Model Examples

Offering:
Entry KaaS



Offering:
Mid-Tier KaaS



Offering:
High-End KaaS

Kubernetes Service Monetization

Market Price Points & Monetization Recommendations

Kubernetes Cluster: Worker & Master Nodes

Single-Node Control Plane:

- Price approx. $850 per year*
- 4 vCPU, 16 GB vRAM
- Limited to 100 Worker Nodes
- Uptime SLA: 99.9%

Multi-Node Control Plane:

- Price approx. $5,200 per year*
- 3x 8 vCPU, 32 GB vRAM
- Limited to 250 Worker Nodes
- Uptime SLA: 99.95%

Custom control plane options

Use same Worker pricing as IaaS VMs

+

Additional Networking Services: Load Balancer & Ingress

Per Tenant Advanced Load Balancer:

- More predictable / less granular compared to hyperscale offerings (by throughput, no. of rules, no. of instances)
- Charge for right-sized Service-Engine cluster(s)
- Offer full set of Kubernetes capabilities: L4 LB, L7 Ingress, WAF, GSLB, DDoS etc.

Hard requirement for VCD (managed private cloud and public cloud)

+

Advanced Kubernetes Services: Management, Registry etc.

Container Registry:

- Charge for VM resources (+ optional managed service fee)

Monitoring / Logging:

- Self-Service: Charge for solution resources (Aria / OSS components)
- Managed Service: Charge per instance under management (node, cluster, VM etc.)

Advanced Cluster Management (TMC):

- Self-Service: Charge for solution resources and license (TMC-SM)
- Managed Service: Charge per instance under management (node, cluster, VM etc.)

* Based on typical hyperscale pricing

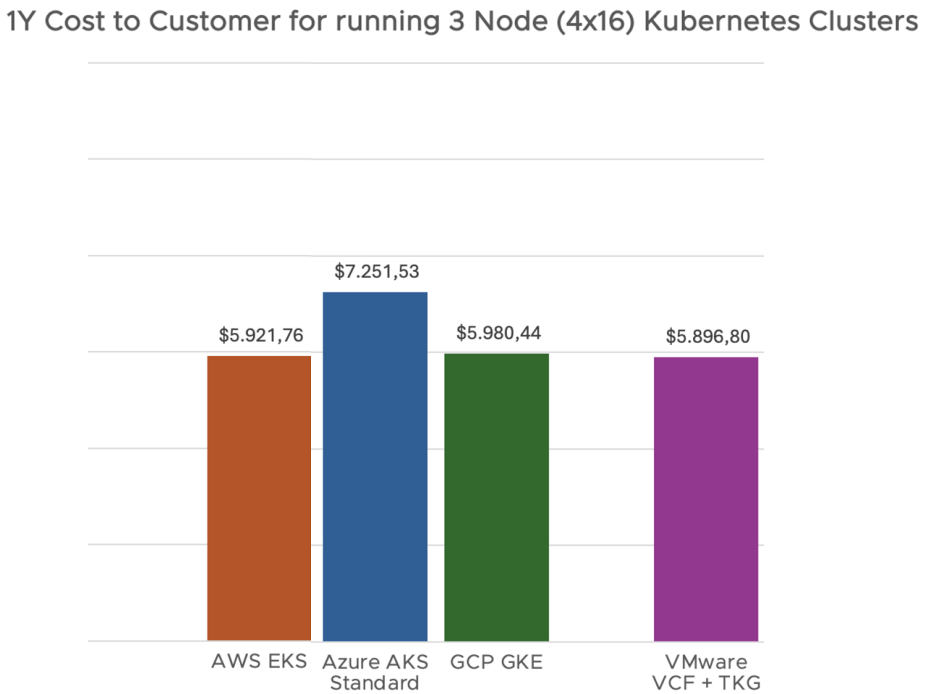
Kubernetes as a Service Offering Competitive Pricing

Example Comparison: Worker & Master Nodes

EKS, AKS, GKE: Standard K8s Offerings don't charge beyond IaaS VM costs plus a control plane fee

More expensive offerings from Hyperscalers like Azure Premium or RHOS

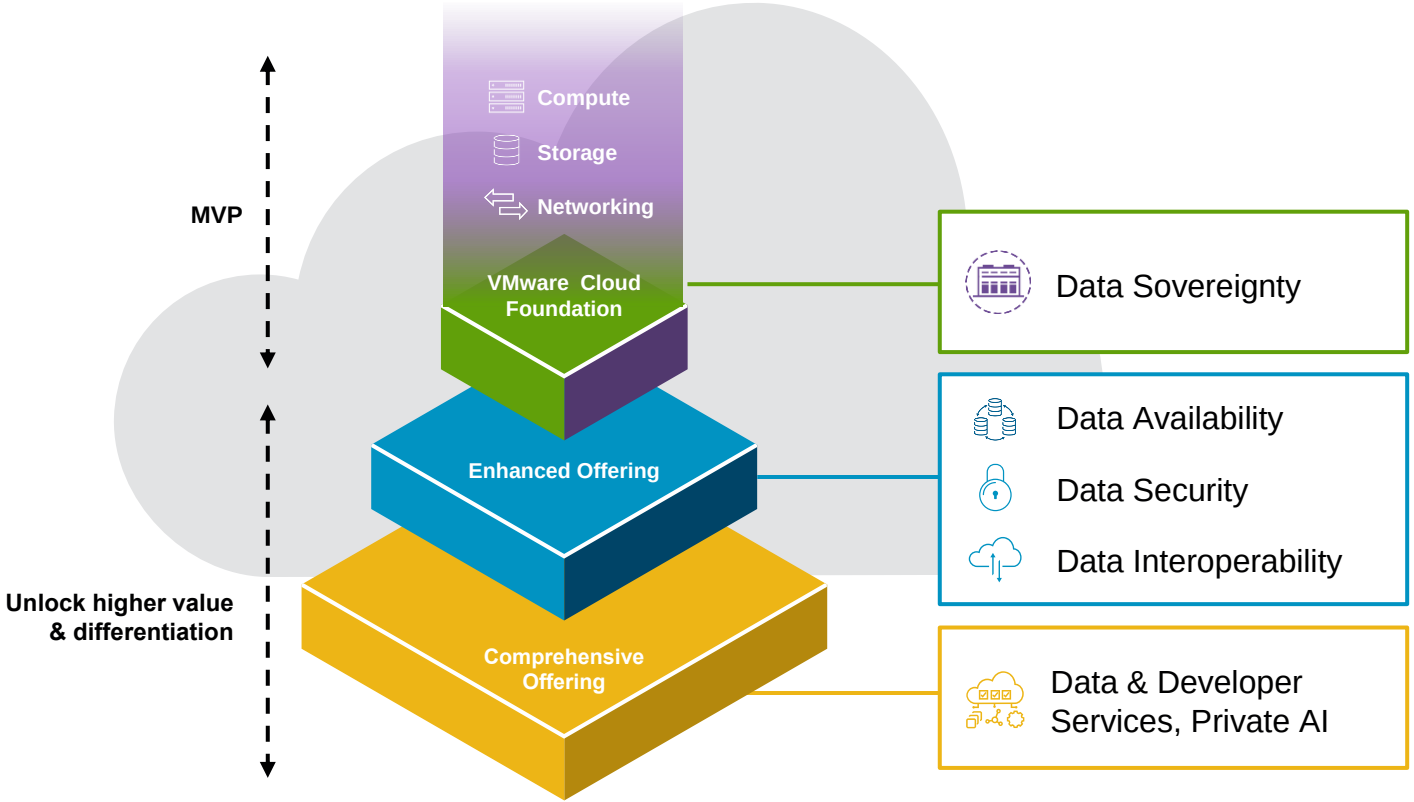
CSP KaaS is Cost Competitive in the Market and a valueable addition to an overall service catalogue



Sovereign Cloud

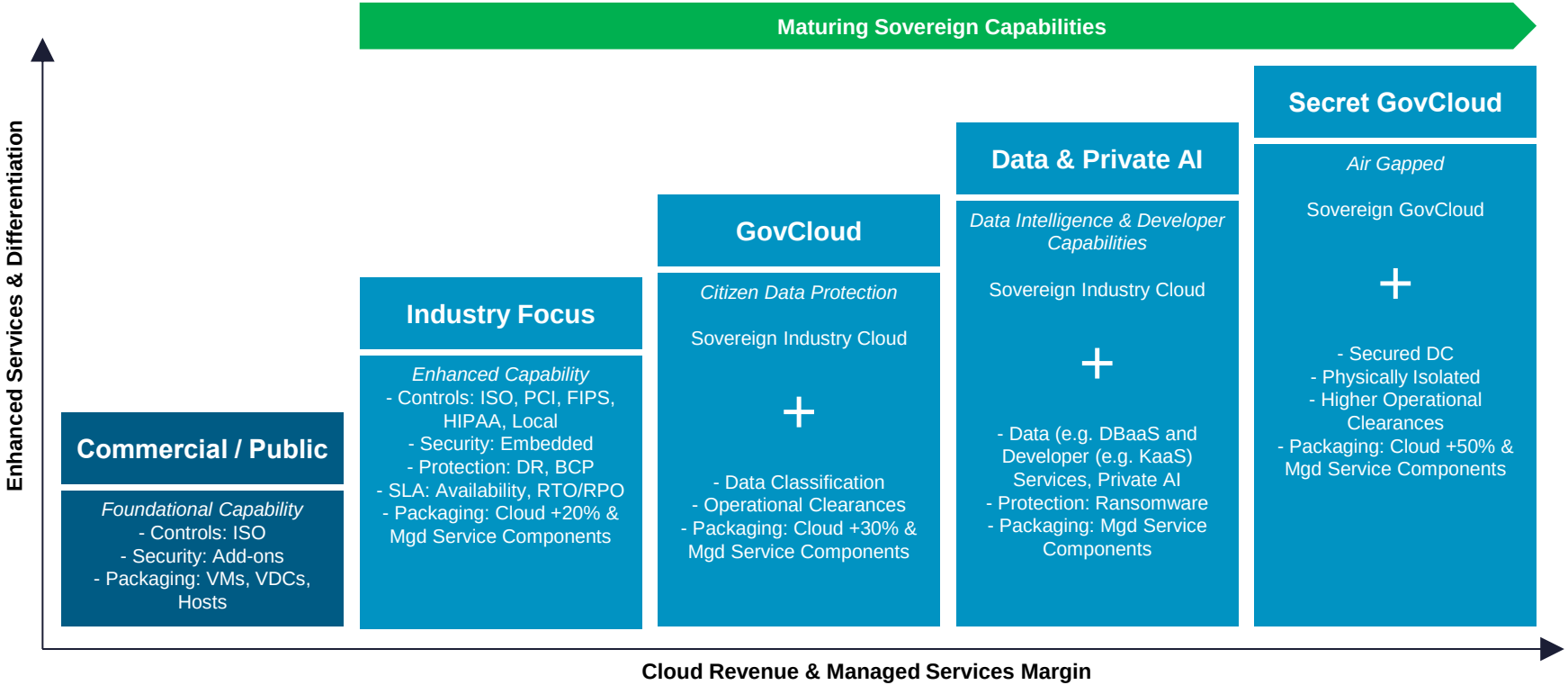
Evolving Sovereign Partner Offerings

From Data Sovereignty to Enhanced Digital Solutions



Delivering a Comprehensive Sovereign Cloud Capability

Managing Workload Risk and Driving Revenue and Margin with Differentiated Sovereign Clouds



Accelerating CSP Growth

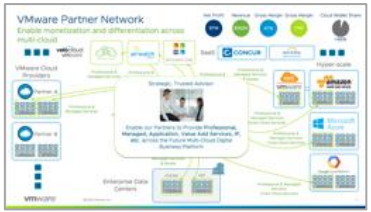
CSP Support from CSP Cloud Practice & CSP Solution Teams

Accelerating partner growth and innovation

Strategy & Business Guidance

Cost Planning & Optimisation

Monetization, Planning & Pricing Strategies



Business Case Development & Deployment Plan

GTM Plan Development & Execution + Field Sales Enablement

Architecture & Design Guidance

Reference Architectures, Design Blueprints

Deep Technical Partner Activation & Enablement

Service Design (HLD) & Offering Development

Solution Validation, PoC Support & Execution

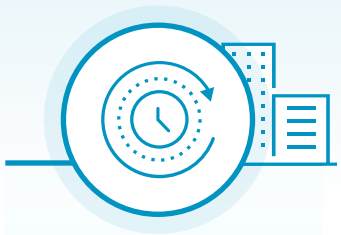
Key Engagement Discussions with CSPs

Cost Planning & Optimisation

- VCF component & pricing review
- General review guidance

Monetization

- GTM Development
- Increased product opportunities
- Cloud growth opportunities
- VCF Platform Solution Kits



Architectural Guidance

- High level designs (HLD)
- Reference architectures
- Platform reviews
- VCF Platform Solution Kits

Co-sell Opportunity

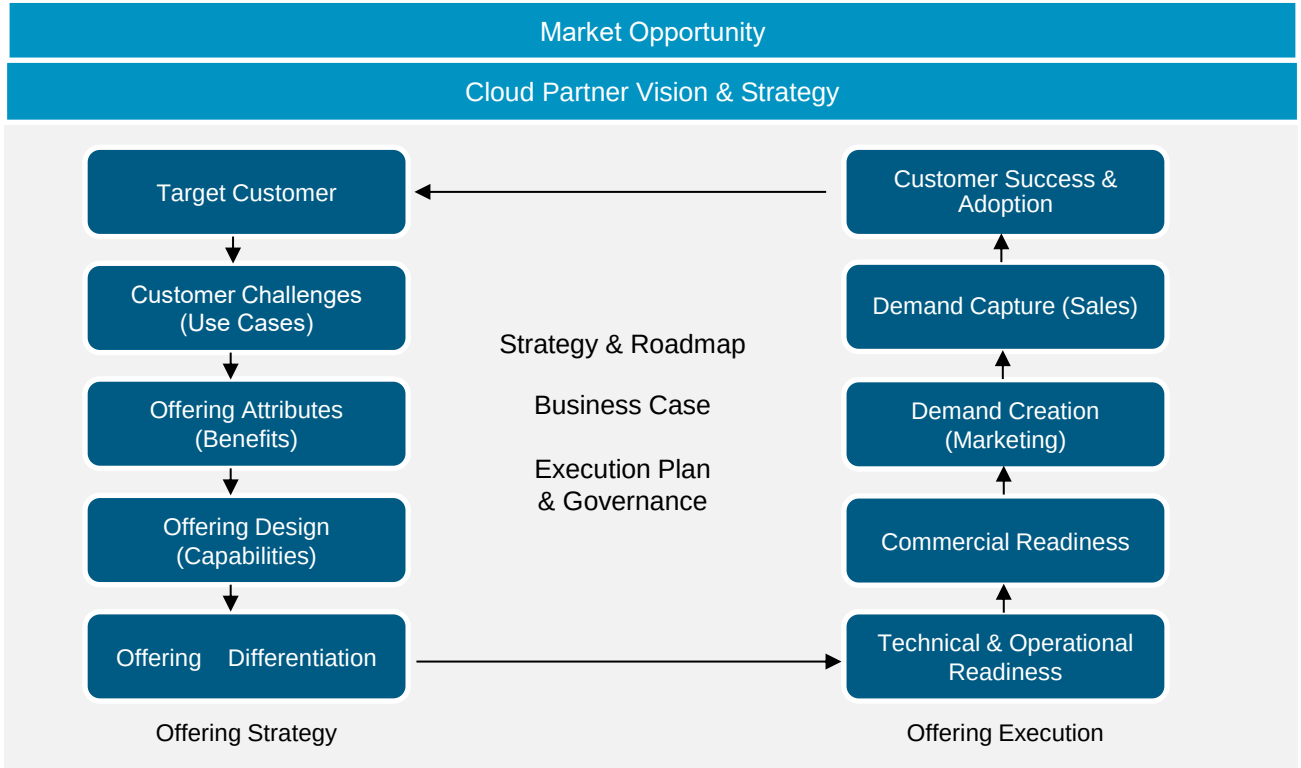
- Core sales introduction
- Marketing guidance
- Target customer or industry verticals

VCF Add-ons

- Consumption of full-stack VCF
- Productization and market penetration

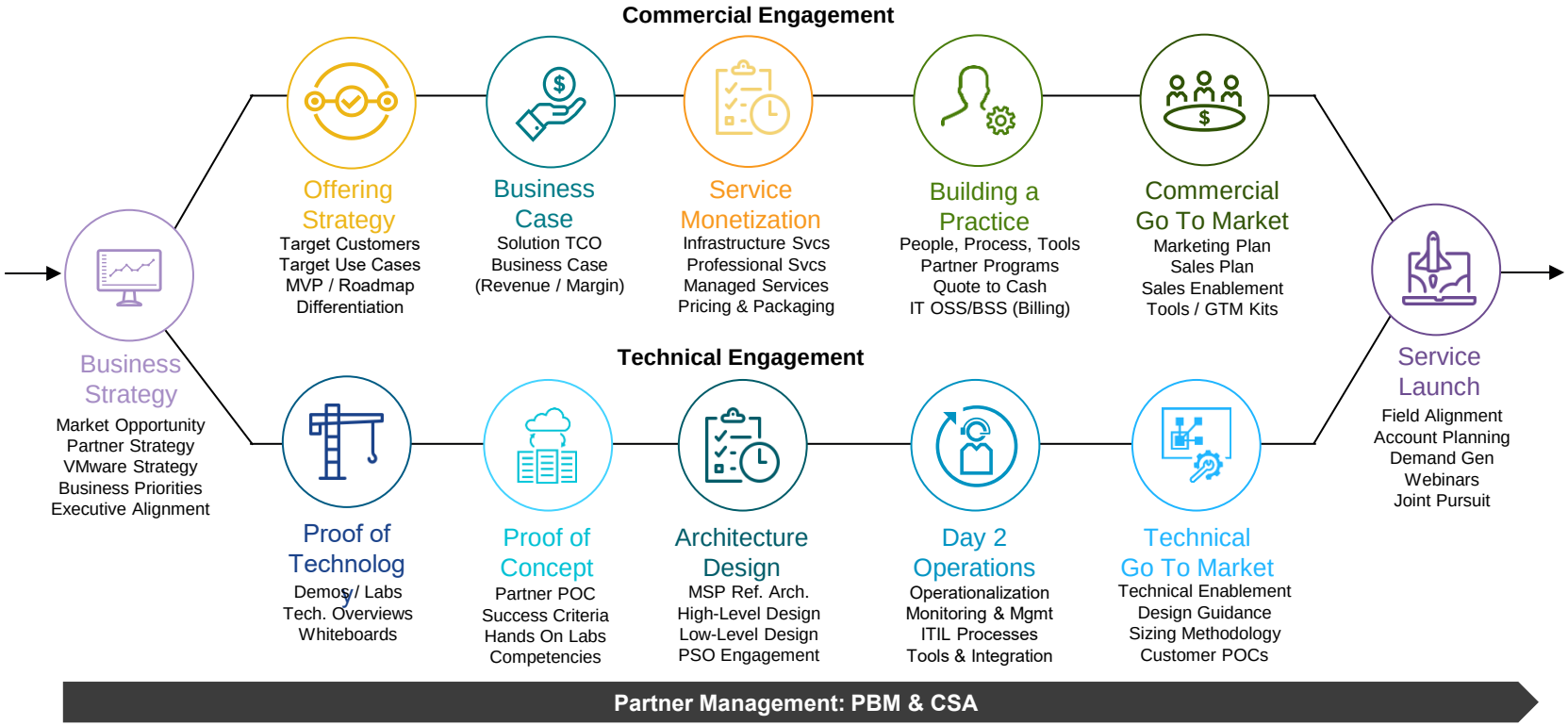
Partner Best Practices Offering Development Framework

Core elements of a partner GTM offering strategy & execution plan



VCSP Acceleration Opportunity

Accelerating partner growth and service creation



VCF Solutions Accelerate CSPs GTM

Enabling our CSPs to deliver differentiated solutions to market

VCF Platform & LCM	VCF Compute	VCF Storage	VCF Networking & LB
Data Protection & DR	Migration	Containers	Data & Developer Services
Security	Cloud Management & Monitoring	Network Monitoring	Ecosystem
Sovereign Cloud	Private AI	Edge	VCF API & Orchestration

CSP Solutions

- Differentiated
- Vertically Aligned
- Professional & Managed Services

Questions?
Book A Meeting

Scan Code Get a Callback or
Contact : phi.dao@crayon.com

Thank You!

Appendix

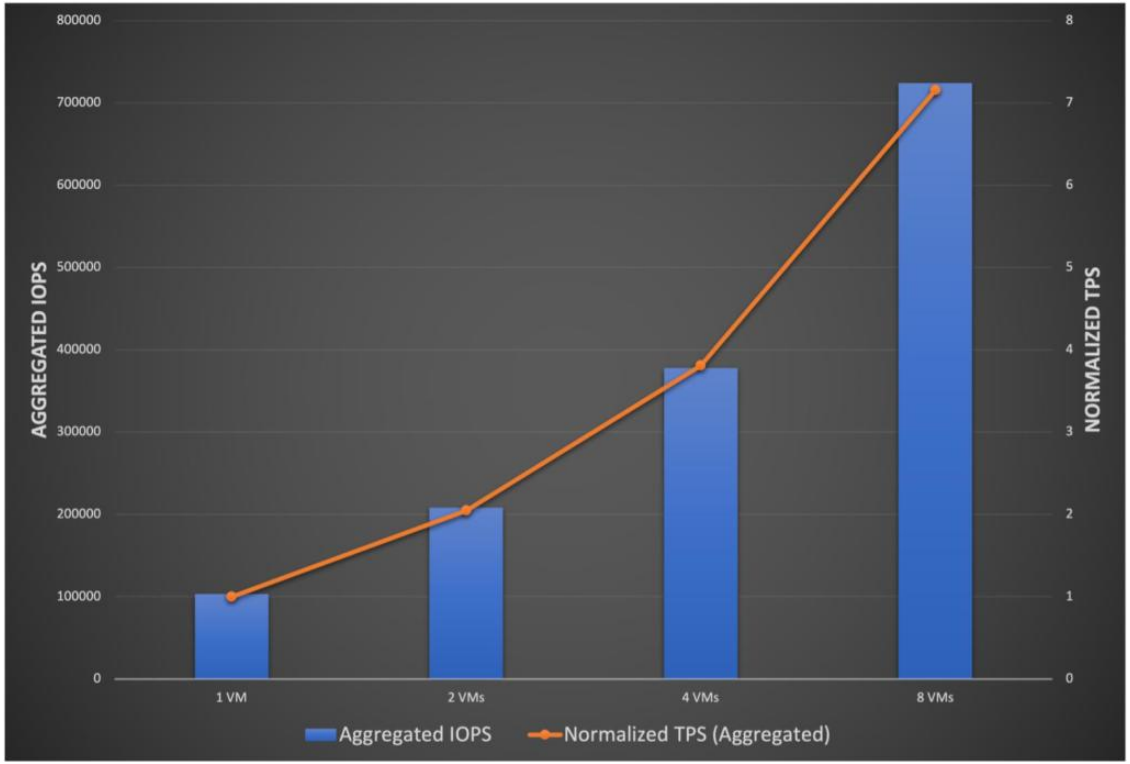
vSAN Turbocharged

Performance Benchmarking

- Shared under NDA, please do not re-distribute
- Indicative benchmarking results obtained given the criteria outlined in the following slides

Database Workloads

Linear Scalability



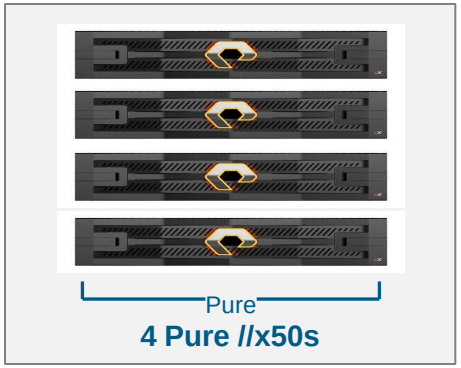
Lenovo ThinkAgile VX7531

- 8 node ESA cluster
- 2 Intel Xeon Gold 6348 @2.60GHz, 28 cores each
- 1024GB RAM
- Mellanox 100Gbits/s full duplex
- 6x6.4TB Micron 7450 NVMe

Pure Storage Takeout with vSAN Max

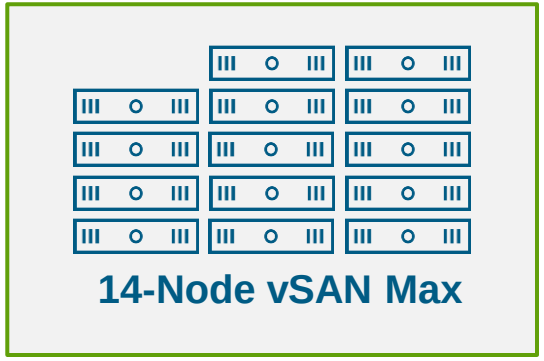
Preliminary Testing

200 VM'S Microsoft SQL Server



Replacing Pure with vSAN ESA

200 VM'S Microsoft SQL Server



Expected Peak IOPS	Cost Baseline
1.8M IOPS (500K IOPS at 27% load)	$1594/TiB (normalized)

Beats Pure Perf.	Lowers TCO
☑ **2M IOPS** (142K/Host)	☑ **$1104/TiB** (30% lower)

Conclusion: vSAN ESA with 14-nodes can match the max performance of 4 Pure Storage Arrays at 31% lower of the cost per TB.

Customer Example - vSAN Performance is Better than Pure

Preliminary Testing

50 VM'S Microsoft SQL Server

Pure

1 Pure Array //X90

Equivalent System

=

50 VM'S Microsoft SQL Server

vSAN

6-Node vSAN Max

Peak Performance
153K Peak IOPS

<

1.7X Higher than Pure
858K Peak IOPS (143K/Host)

vSAN Performance Details: Benchmark Testing

8K 70/30 Random Read Workload - Equivalent to SQL Database Workload

Preliminary Testing

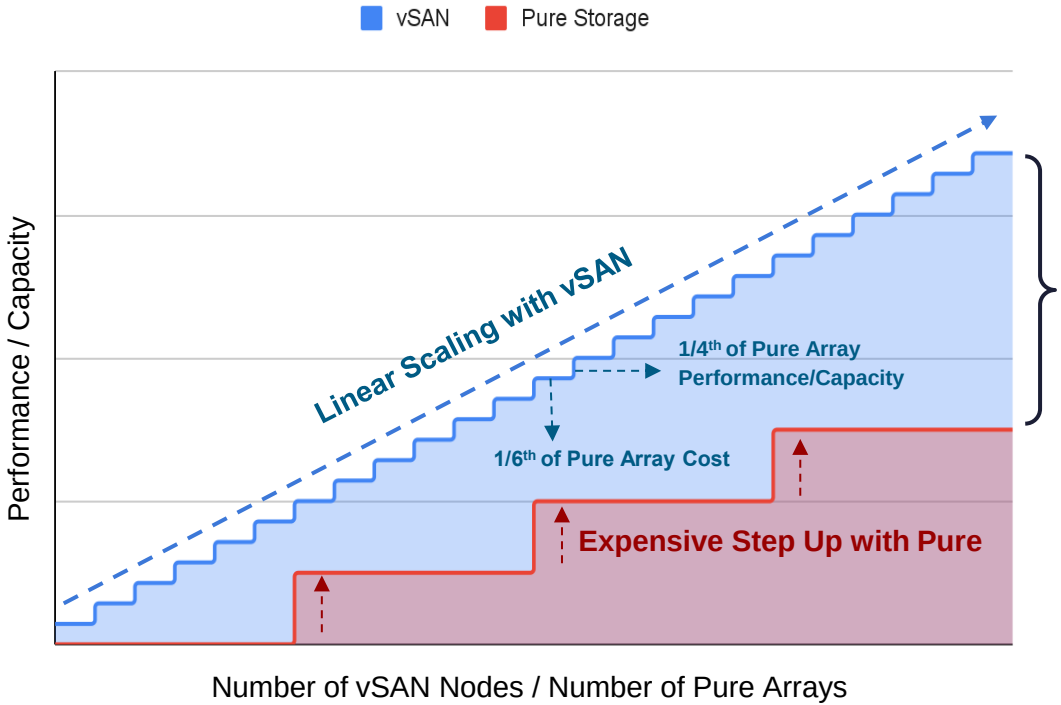
vSAN ESA & vSAN Storage Cluster – Benchmarks (vSAN 9.0, 25GbE + NVMe)

Metric	vSAN ESA (1 Node)	vSAN ESA (6 Nodes)	vSAN Storage Cluster (1 Node)	vSAN Storage Cluster (6 Nodes)
Peak IOPS (8KB, 70% Reads)	~143K	~858K	~142K	~852K
Latency	sub-ms	sub-ms	sub-ms	sub-ms

Identical Testbed for Apples-to-Apples Comparison

Storage Cluster	HCI Cluster
Hardware configuration: ● vSAN ESA ● 6-node cluster ● FTT=2 R6 ● 6 NVMe devices per host ● 56 cores/host ● 768G RAM per host ● 25GbE networking	Hardware configuration: ● vSAN ESA ● 6-node cluster ● FTT=2 R6 ● 6 NVMe devices per host ● 56 cores/host ● 768G RAM per host ● 25GbE networking

vSAN vs Pure Storage : Performance Scalability



- **vSAN**'s Scale-Out Model: Predictable, **Linear Growth**
- **Pure Storage**'s Scale-Up Model: **Expensive Step Up**

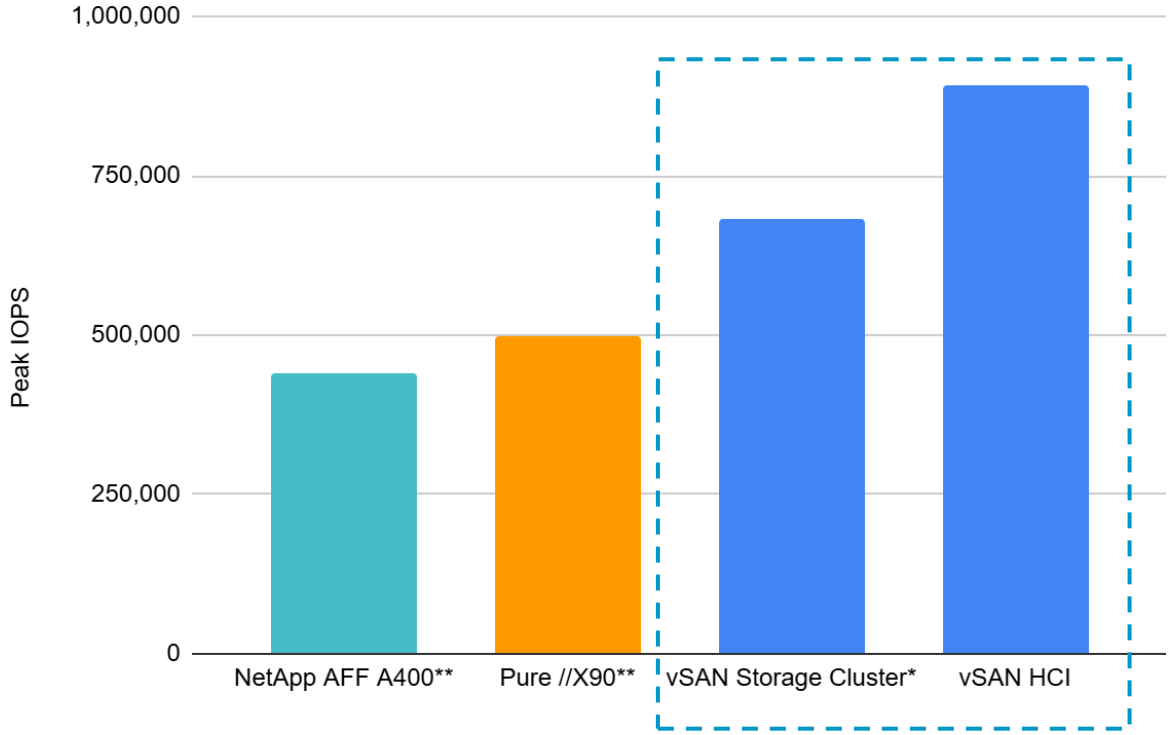
Conclusion

- vSAN offers better scalability of **performance** and **capacity** **without** unnecessary **overprovisioning**

Disaggregated Storage

Performance Comparisons - VCF 5.2

Comparing traditional storage with vSAN deployments



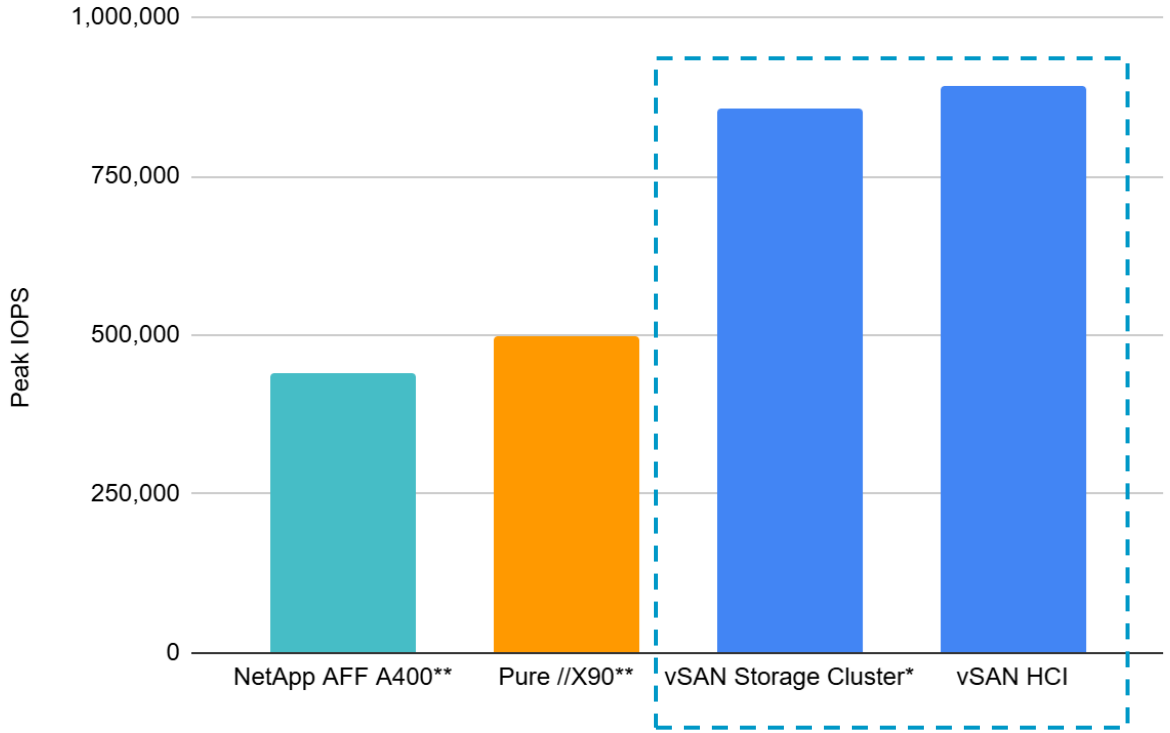
- vSAN HCI performance is ~1.8x higher than equivalent traditional storage platforms
- vSAN Storage Cluster performance is ~1.4x higher

*vSAN metrics based on 6-node cluster configurations

**Source for NetApp & Pure performance numbers: (netapp.com/blog/performance-and-investment-protection-in-the-datacenter/)

Performance Comparisons - VCF 9.0

Comparing traditional storage with vSAN deployments



- VCF 9.0 closes the gap between vSAN Storage Cluster & vSAN HCI
- Performance gap between vSAN Storage Cluster and traditional storage increases to ~1.7x

*vSAN storage cluster configured with traffic separation, vSAN metrics based on 6-node cluster configurations

**Source for NetApp & Pure performance numbers: (netapp.com/blog/performance-and-investment-protection-in-the-datacenter/)