



Broadcom (AVGO) - VMWare (VMW) Merger Analysis

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Analysis Summary

Merger Rationale

Executive Summary: Merger Rationale - Business and Market Reasoning

Business Rationale



Limited Overlap
Between AVGO and
VMW Offerings



Market Leader w/ High
Degree of Enterprise
Adoption and
Stickiness for VMW
Offerings



VMW's Virtualization
Offerings Complement
Less-Scaled Segments
of Prior Acquisitions
(e.g., Brocade, CA
Technologies,
Symantec)

- *Hyperconverged infrastructure has grown at an estimated CAGR of 64% in recent years, suggesting a shift towards hypervisor software / virtualization as controller of hardware resources needing to be allocated*
- *VMW's focus on virtualization does not currently overlap with AVGO's primary hardware offerings, creating limited redundancy as a combined entity; instead, VMW's hypervisor software "stacks on top" of AVGO hardware to distribute resources across virtual machines*
- *AVGO has shifted its focus towards software M&A rather than purchasing existing hardware providers; offerings of prior acquisitions can readily complement VMW offerings by strengthening its networking and security capabilities, with VMW able to complement less-scaled virtualization offerings*
- *VMW's numerous partnerships and availability across on-premise and cloud environments provides AVGO the ability to "plug-and-play" at high scale given VMW's existing level of enterprise adoption and stickiness across organizations / data centers*
- *As data processing and low latency become more scrutinized given trends such as Edge Computing and AI / Machine Learning, VMW provides ready compatibility with devices such as edge servers and SmartNICs*

Market Rationale



VMW Brings AVGO
Greater Control Near
the Application Level –
Relevant as
Hyperconverged
Infrastructure
Adoption Increases



VMW Helps Bolster
AVGO's Edge, DPU,
Hybrid Cloud Offerings



VMW Possesses Ability
to De-Risk
Containerization
Adoption over
Traditional VMs

Synergies & Value Creation

Revenue and Cost Synergies / Projected EPS Accretion

Revenue Synergies

Unmatched OS Support → Greater Flexibility in Increasing Pricing	Increased Ability to Focus on Distribution and Renewal Through Subscriptions	Software Sales Opens Hardware Cross-Selling Opportunity, and Vice Versa
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Cost Synergies

Operating Costs Consolidated Across R&D and SG&A	Greater Focus on R&D Efficiencies Driving Existing Compatibility Rather Than Futuristic Product Delivery
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Projected EPS Accretion

	2023	2024	2025	2026	2027	2028
Accretion / (dilution) (\$)	0.8	2.5	3.3	3.1	2.5	1.8
Accretion / (dilution) (%)	2%	6%	6%	4%	3%	2%

- *VMW's leading market share and unmatched offering capabilities /compatibility provide value to data centers and enterprises, suggesting an ability for VMW to adopt increased pricing with limited customer pushback*
- *VMW will additionally provide AVGO with a larger customer base; while AVGO has historically focused on 600 "key" customers and perpetual licensing, AVGO can more readily focus on distribution and renewal through subscriptions rather than engagement and support, maintenance through licensing*
- *Given limited overlap between AVGO and VMW, cross-selling opportunities will stem from both a need for virtualization related software and general server hardware, providing greater potential tickets for individual sales teams*
- *VMW effectively manages costs, with expenses consolidated between R&D and SG&A accounts, providing a clear path towards increasing EPS*
- *A merger with VMW is expected to be immediately accretive for AVGO, with further ability to quickly de-lever VMW's debt load given its effective cash flow generation ability relative to peers*

Detailed Analysis

Industry Overview

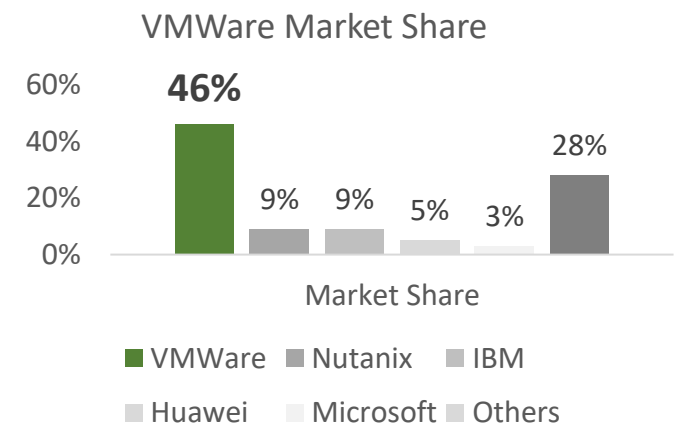
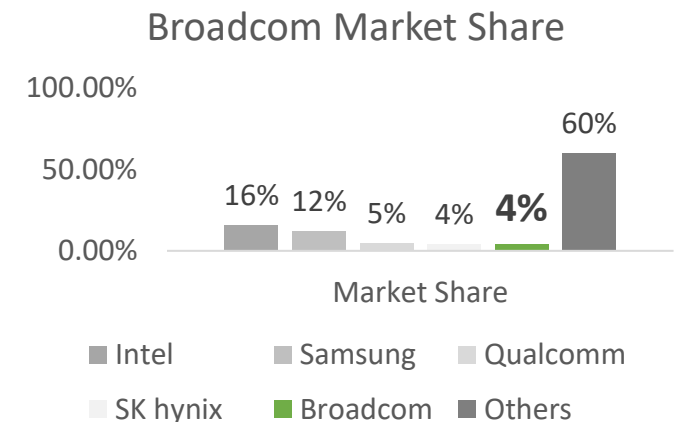
Major shifts in semiconductor / virtualization use cases creates a need for greater convergence between hardware infrastructure and the virtualization layer

Semiconductor and Virtualization Industry Overviews

Increasing Demand Across End Customers / Use Cases	Semiconductors are increasingly being used across a variety of end products ranging from servers, smartphones and PCs to a variety of mission-critical devices such as autonomous vehicles and automation machinery
Greater Adoption from Non-Specialized / General Consumers	33% of general consumers currently believe they use AI, while actual usage is 77%; as consumers become increasingly aware of similar trends resources will likely face additional strain and need for more effective resource management

Resulting in...

Innovations in Hyperconverged Infrastructure	VMW estimates the market size of hyperconverged infrastructure (HCI) grew at a CAGR of roughly 64% between 2015 and 2019; HCI is powered by hypervisor software rather than physical hardware, representing a significant shift in infrastructure design and scalability
Greater Need for Compatibility b/w Software and Hardware	In addition to HCI, demand for security, lower latency, and effective resource allocation has led to a greater need for hardware compatibility between hypervisors given trends in edge computing, hybrid cloud management, and AI, ML / automation

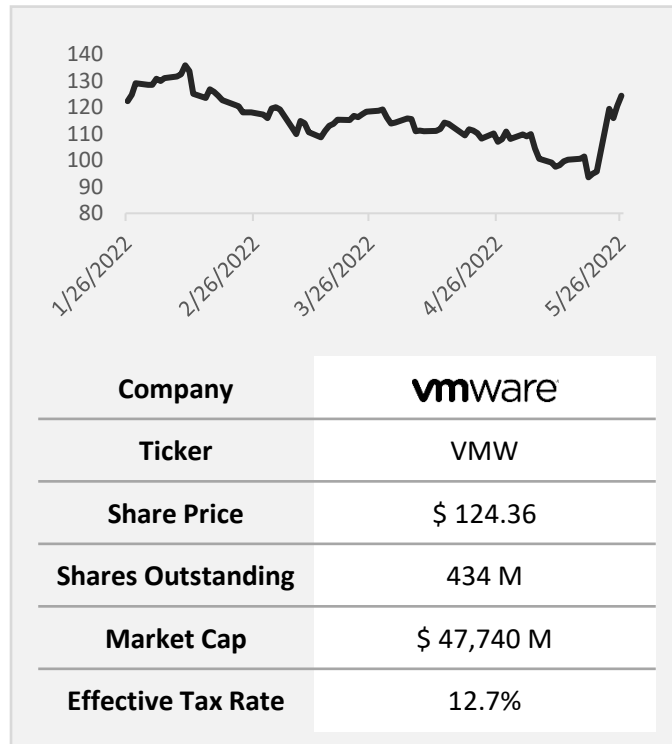


Company Overviews

VMWare (VMW) Overview

VMW Product and Business Overview

Virtualization		Storage	Networking + Security	Cloud Infrastructure		End User Computing		Cloud Native Apps
vSphere	vCenter Server	vSan	NSX	vRealize Suite	VMW Cloud Foundation	Workspace ONE	Horizon	Tanzu

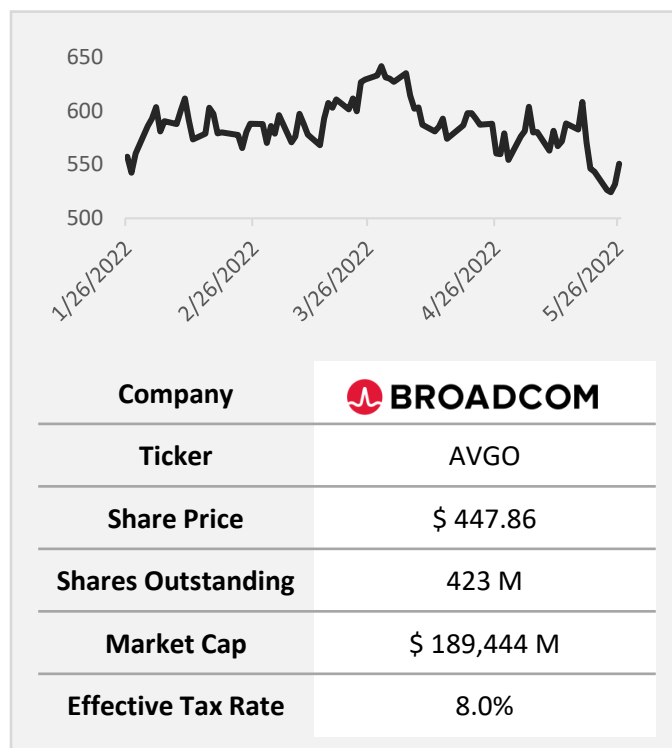


- **Origins:** VMW was founded in 1998 in Palo Alto, CA, where it is currently headquartered
- **Virtualization:** VMWare is most recognized for its virtualization software / OS offerings, allocating hardware resources from physical machines across virtualized machines (VMs)
- **Other Offerings:** VMW's bulk of revenue stems from virtualization offerings, but it further originates revenue from storage, security / endpoint management, network, management, and DevOps solutions
- **Enterprise Adoption:** VMWare is heavily adopted by enterprises, with an 80% of all virtualized workloads running its virtualization software
- **Key Partnerships:** VMW is currently partnered with all three major cloud providers (CSPs) along with many smaller CSPs, allowing easy migration of on-premise VMW workloads into AWS, Azure, GCP and other environments

Broadcom (AVGO) Overview

AVGO Product and Business Overview

Semiconductors	Infrastructure Software	Networking Solutions	Enterprise Software	Mainframe Software	Cybersecurity Solutions
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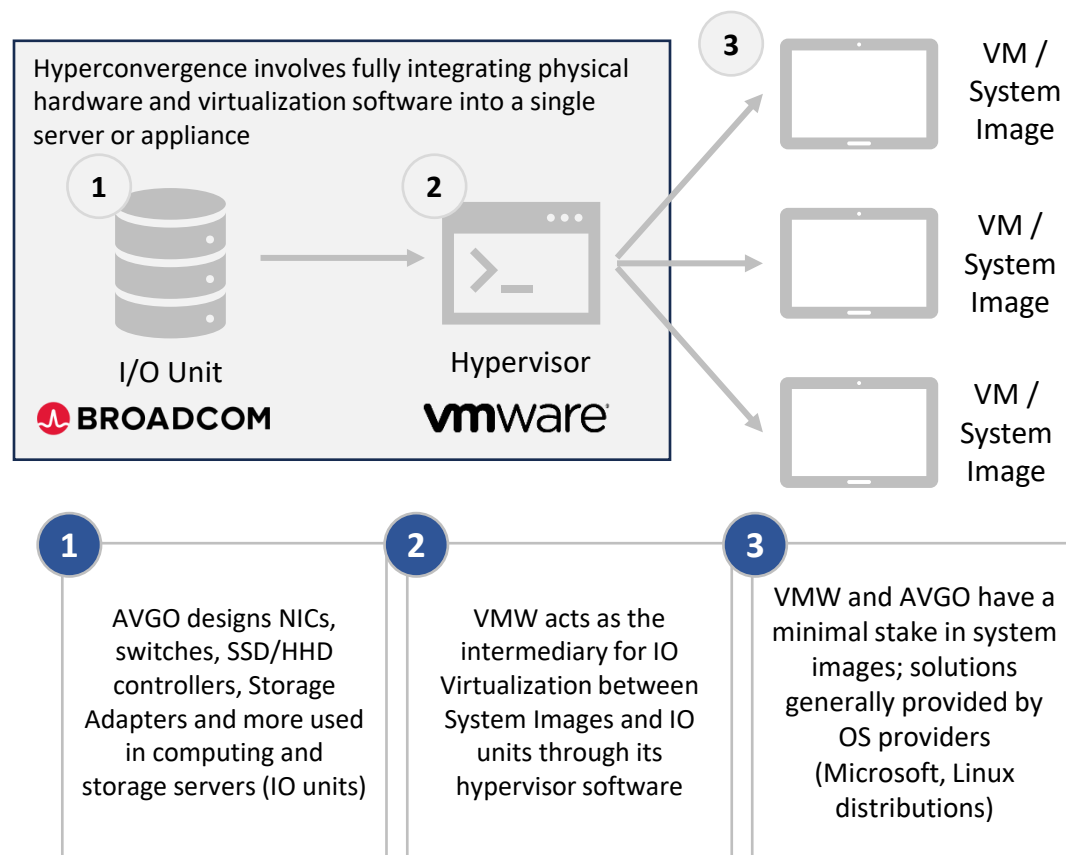
- **Origins:** Broadcom's roots trace back to 1961 as Hewlett Packard's hardware division (HP Associates); Broadcom was acquired by Avago in 2016, and is currently headquartered in Palo Alto, CA (formerly Singapore)
- **Networking:** AVGO is most known for its networking-related hardware solutions, including Network Switches, PHY, Fibre Optics, and Network Adapters / NICs
- **Software Segment:** AVGO's infrastructure software solutions enable customers to manage and secure on-prem and hybrid cloud environments, and primarily serve enterprise organizations
- **End Customers and Devices:** AVGO is diversified across end customers and devices, with its hardware offerings integrated into physical servers, telecom equipment, machinery, mobile devices, and more

Merger Rationale

VMW and AVGO offerings do not overlap in purpose, and instead complement each other through software-hardware compatibility

Relation Between VMW Software and AVGO Hardware

Virtualization Overview



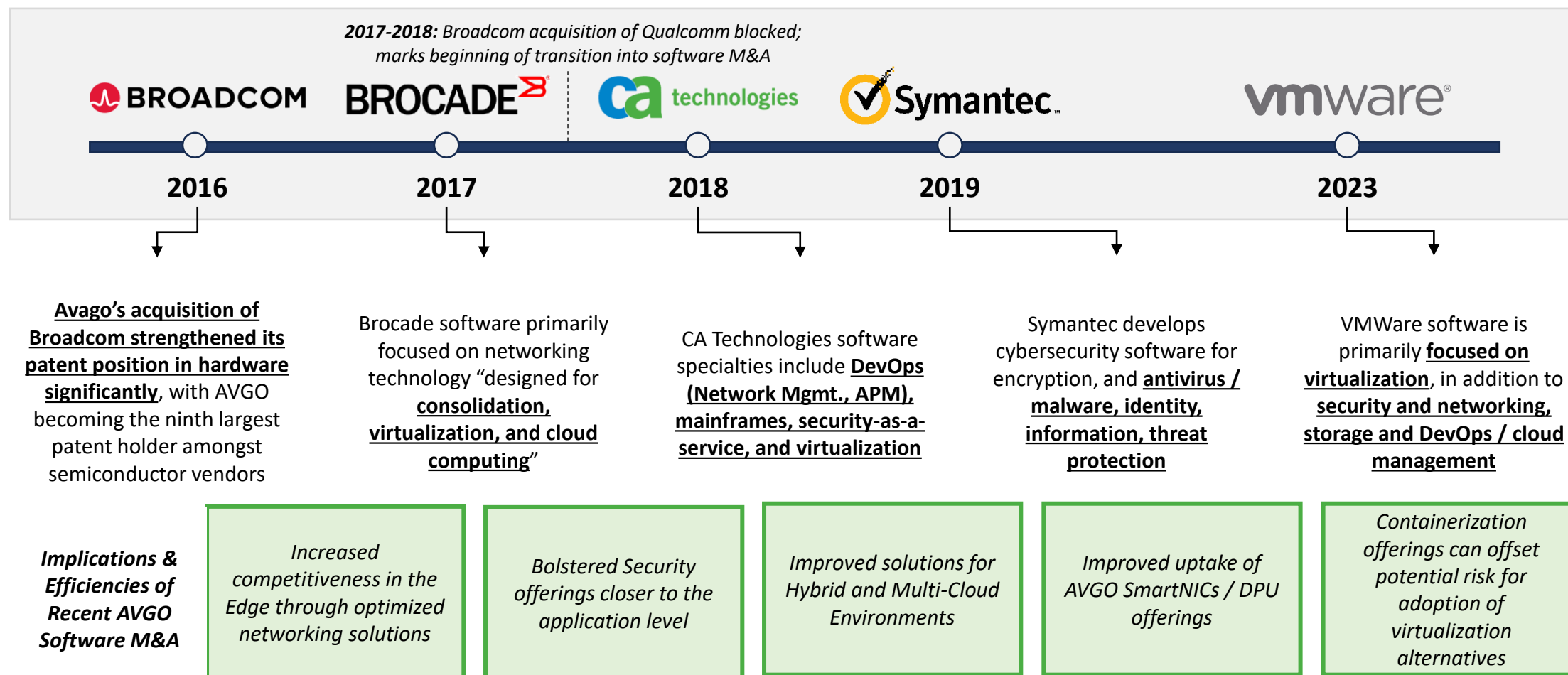
Commentary

- Machine virtualization is driven through hypervisor (software) “stacked” onto physical servers and systems to distribute resources such as CPU and memory to individual VMs
- VMWare is the leading virtualization software / hypervisor provider, controlling an estimated 79% share of the virtualization market
- Broadcom components essentially use VMW’s virtualization software to drive software optimization and ensure efficient communication between physical and virtual machines
- AVGO and VMW have already demonstrated ability to successfully partner; in 2020, AVGO’s Emulex Fibre Channel Host Bus Adapters (HBAs) became the industry’s first-ever HBAs to provide full support for VMware ESXi 7.0 hypervisor

Overall, limited overlap exists between the two companies, offering an opportunity to improve efficiency and compatibility between offerings

Prior M&A activity readily complements VMW's core virtualization offerings

Broadcom Software M&A – 2016 to Present



VMWare is a clear market leader with highly adoption and sticky across enterprise IT / data center infrastructure

VMW Key Facts, Figures – Stickiness and Enterprise Adoption

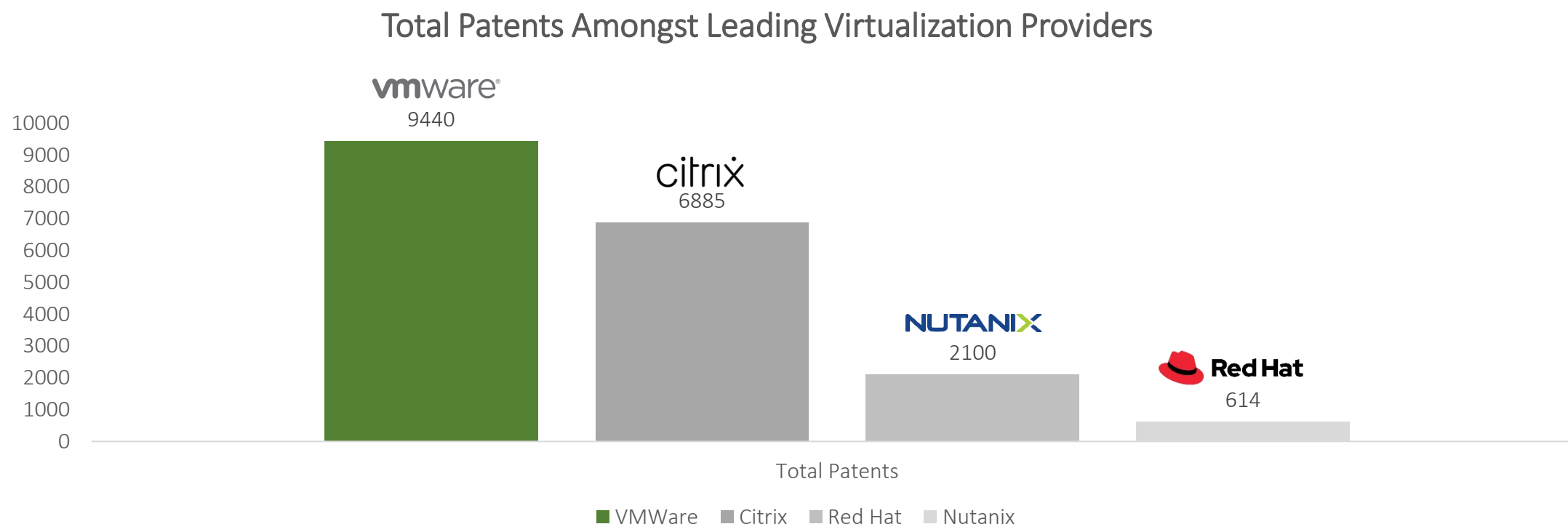
VMW Key Figures



- **High Adoption:** VMWare is currently the best-in-class virtualization offerings as suggested by its high enterprise adoption, in addition to its major hyperscaler partnerships
- **High Switching Cost / Stickiness:** VMW's ability to work across on-premise, edge, public, private, and local clouds in all operational models suggests that its software is oftentimes deeply rooted in various IT infrastructures, making switching both complex and costly; enterprise environments are noted to take several months for new vendors to be tested and approved
- **Degree of Expertise Required:** VMW Professional certification takes roughly two years to earn, implying that 1) individuals maintaining virtualization systems are more familiar with VMW's offerings than those of competitors, and 2) will be less likely to suggest switching given time invested in earning related qualifications

VMWare patents vastly outnumber those of its primary competitors





VMWare Total Patents Relative to Competitors



- VMW holds **over 1500 patents for its NSX offering, providing networking and security virtualization** for added protection across VMWs
- Both networking and security related intangibles are highly desirable for AVGO, potentially providing significant cost savings on future R&D

VMW possesses higher operating margins and generates greater cash return on assets compared to peers

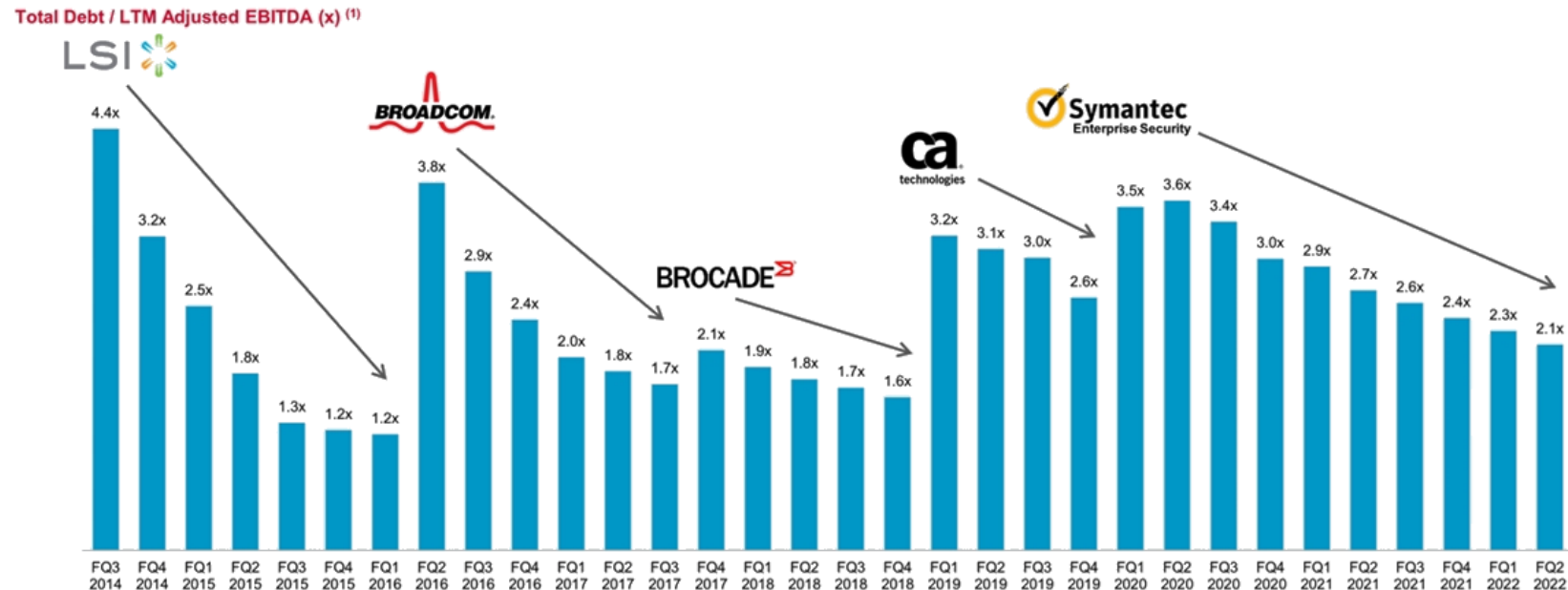
VMW Financial Metrics Relative to Industry, AVGO

	 BROADCOM BROADCOM (AVGO)	 vmware VMWARE (VMW)	 citrix CITRIX SYSTEMS (CTX)	 NUTANIX NUTANIX (NTNX)	INDUSTRY AVG.
	FY22	FY22	FY21*	FY22	FY21/22
Gross Margin	68%	82%	83%	78%	81%
Operating Margin	43%	19%	7%	-63%	-12%
R&D % Sales	15%	24%	18%	42%	28%
SG&A % Sales	4%	18%	37%	99%	51%
Cash Return on Assets	23%	15%	8%	-7%	6%
ROE	51%	-208%	56%	86%	-22%
Leverage Ratio	2.23	(33.74)	11.75	(3.25)	(8.41)
Sales per Employee (\$M)	\$ 1.66	\$ 0.34	\$ 0.33	\$ 0.21	\$ 0.32

- *AVGO, traditionally focused on lower-margin hardware, has an opportunity to take advantage of higher margins through VMW's software offerings*
- *While VMW's operating margins are currently higher than those of its primary virtualization-focused competitors, high spend on R&D and SG&A compared to AVGO suggests opportunity for potential operating efficiencies / cost reduction*

While VMW carries high levels of debt, AVGO has proven ability to quickly de-lever companies which it acquires

AVGO Prior M&A Debt Management



Source: Broadcom Investor Presentation

1. Balance sheet debt, net of debt discount and issuance costs and includes finance leases

- AVGO has successfully proven its ability to reduce debt through effective pricing and operational expenses management tactics; in most cases, AVGO is able to reduce Total Debt as a function of EBITDA from ~4.0x to ~2.0x (50% reduction) in less than two years
- An assumption of \$8B of VMW debt places VMW's Total Debt/LTM Adjusted EBITDA ratio at ~3.4x at the date of acquisition, comparable to prior M&A

Synergies and Integration Costs

VMWare can capture revenue synergies through increased pricing and cross-selling, in addition to expanding its subscription services to a broader customer set

Pricing Flexibility and Sales Volume Opportunities

Increased Pricing

Rationale:

- VMW will benefit by being “closer to hardware” improving software compatibility and performance
- Currently unmatched OS support (30+ compared to ~11 for MSFT, 20 for CTRX)
- Cloud-ready with limited need for re-writing applications
- Differing pricing models between vendors leads to limited comparability (purchases dictated by current usage / perception)

Subscription Model

Rationale:

- Ability to acquire new customers; AVGO currently focused on 600 “key” customers
- Subscription models traditionally less focused on support / maintenance
- VMW acquisition will likely result in a sizeable increase in customer base
- AVGO can be afford to be less engaged with non-key customers and instead focus on distribution and renewal

Cross-Selling

Rationale:

- VMW has currently positioned itself to deliver competitive multi-cloud offerings
- VMW’s existing customer base is extremely sticky; in cases where AVGO chips are not currently used, potential for improved compatibility / performance may instill purchase incentive for AVGO offerings
- Trends like AI further drive need for improved integration between network, storage, compute units and the virtualization layer

VMW can seek to more effectively control its SG&A costs, in addition to better focusing R&D on driving product compatibility

Operational Cost Management Opportunities

VMW Salesforce Reduction

Rationale:

- VMW investment in its salesforce stems highly from culture rather than necessity; VMW spends roughly 4x on SG&A v. AVGO on a per sales basis
- Through the deal, VMW will gain access to AVGO sales accounts, facilitating more streamlined future sales growth with likely less effort
- Similarly, cross-selling hardware and software solutions can enable greater sales per customer without the requirement for additional sales personnel
- Savings from reductions in SG&A can be used to support other operational areas, including R&D, and may also facilitate more timely debt paydown
- VMW ranked the 3rd highest paying company in the US in 2017

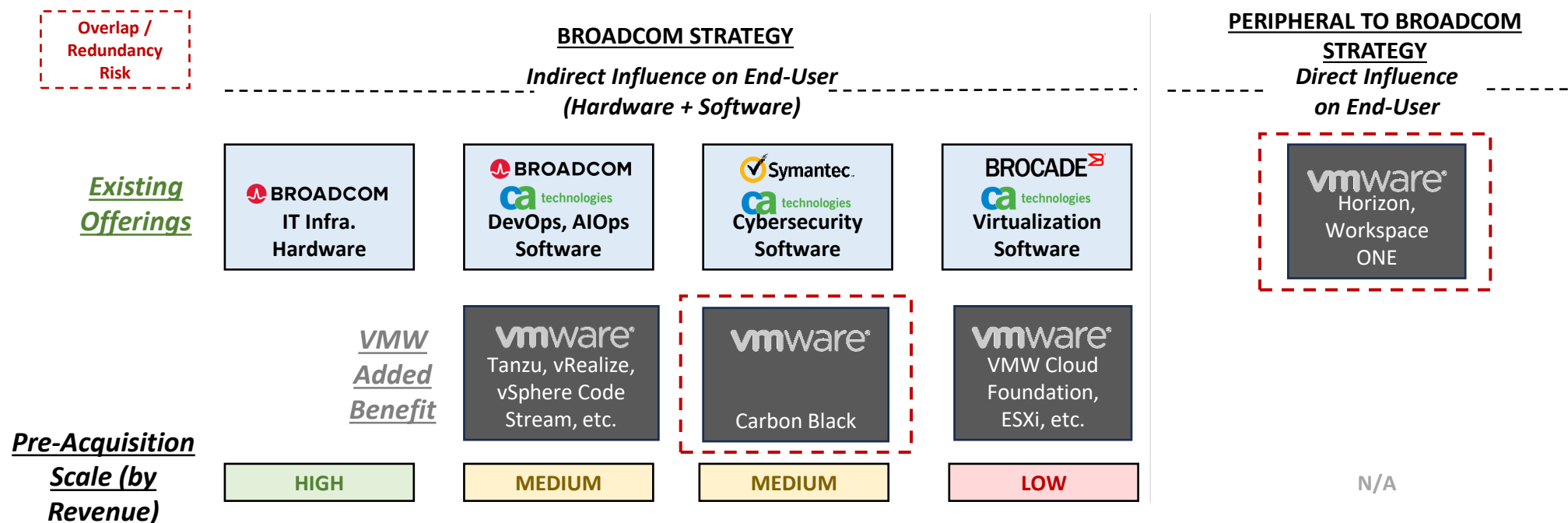
Seek R&D Efficiencies

Rationale:

- R&D is necessary, and need not be “shut down”, rather be strategically focused on the short-term compared to the long-term
- Pre-acquisition, VMW noted “future plans include significant investments in software research and development and related product opportunities”
- AVGO need not focus on expanding VMW’s portfolio of related offerings, and can instead focus efforts on maximizing compatibility with existing and new AVGO and related hardware

Opportunities for divestiture exist for VMW's Carbon Black and Workspace ONE offerings, primarily given potential overlap and deviation from AVGO core strategy

Business Overlap and Opportunities for Divestiture



- Broadcom's overall strategy is focused on the infrastructure and related software (e.g., cybersecurity, virtualization, DevOps) that supports the applications used by the end-user; however, Broadcom is not *directly* focused on the end-user itself, rather indirectly
- As such, Broadcom's planned divestiture of VMW's End-User Computing segment is given its peripheral focus to its product strategy, while its planned divestiture of Carbon Black most likely stems from potential redundancy given Symantec's existing scale in AVGO's portfolio

Deal Overview & Value Creation

Deal Overview

AVGO, VMW Transaction Details and Deal Overview

Transaction Details	
Deal Announcement	May 26, 2022
Deal Size	\$61B, including assumption of \$8B VMW debt
Offer Structure	Cash and stock merger
Synergies	Est. \$28B over five years post-closing
Integration Costs	Est. \$2B realized in first year post-closing
Closing Date	Nov 22, 2023

Additional Transaction Detail

- *VMW shareholders given opportunity to elect between \$142.5 in cash or 0.2520 shares of AVGO for each VMW share, subject to proration of ~50% cash and ~50% AVGO common stock*
- *Upon closing, an estimated 88% of existing AVGO shareholders, and 12% of VMW shareholders own the newly combined entity*
- *Acquisition includes commitments of \$32B in fully committed debt financing*

EPS Accretion / Dilution Analysis

Projected EPS Accretion and Dilution (2023 to 2028)

	Projected					
<i>Year</i>	<i>2023</i>	<i>2024</i>	<i>2025</i>	<i>2026</i>	<i>2027</i>	<i>2028</i>
Standalone AVGO Net Income (M)	\$ 12,985.6	\$ 18,498.7	\$ 23,767.8	\$ 29,889.8	\$ 37,958.4	\$ 47,372.9
Proforma Net Income (M)	\$ 15,189.5	\$ 22,312.2	\$ 28,707.2	\$ 35,623.7	\$ 44,505.3	\$ 54,929.7
Standalone Shares Out (M)	423	423	423	423	423	423
Shares Issued (M)	60	60	60	60	60	60
Proforma Shares Out (M)	483	483	483	483	483	483
Standalone BuyerCo GAAP EPS	\$ 30.7	\$ 43.7	\$ 56.2	\$ 70.7	\$ 89.7	\$ 112.0
Proforma EPS	\$ 31.5	\$ 46.2	\$ 59.5	\$ 73.8	\$ 92.2	\$ 113.8
Accretion / (dilution) (\$)	0.8	2.5	3.3	3.1	2.5	1.8
Accretion / (dilution) (%)	2%	6%	6%	4%	3%	2%

Standalone v. Proforma Intrinsic Value (DCF – Levered FCF Approach)

Standalone v. Combined Intrinsic Valuation

Entity	Intrinsic Share Price	Current Share Price	Premium
vmware (Standalone)	\$ 153.51	\$ 124.36	23%
BROADCOM (Standalone)	\$ 776.55	\$ 550.66	41%
BROADCOM (Combined)	\$ 842.62	\$ 550.66	53%

WACC

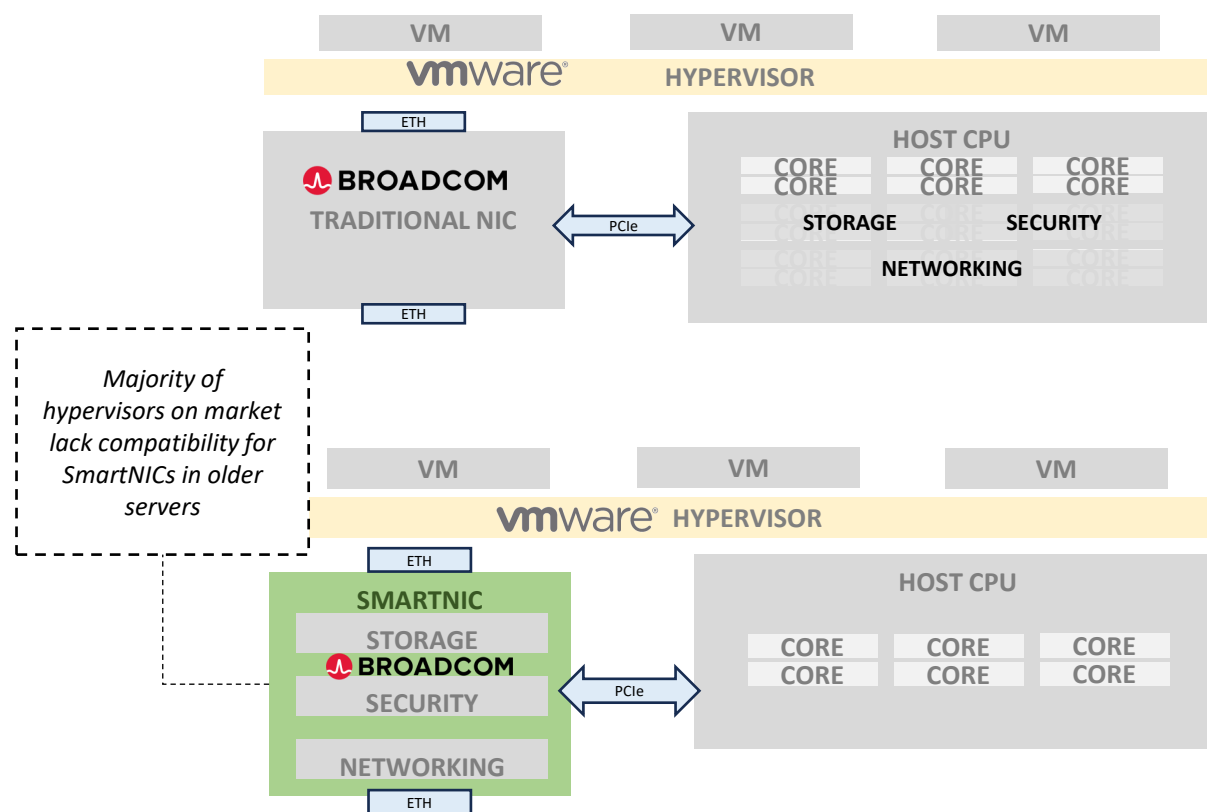
	10%	12%	13%	14%	15%
1%	\$ 832.4	\$ 707.9	\$ 611.3	\$ 534.3	\$ 471.7
2%	\$ 944.0	\$ 786.6	\$ 668.8	\$ 577.5	\$ 504.8
3%	\$ 1,100.2	\$ 891.5	\$ 742.8	\$ 631.5	\$ 545.3
4%	\$ 1,334.6	\$ 1,038.4	\$ 841.4	\$ 701.0	\$ 595.9
5%	\$ 1,725.2	\$ 1,258.8	\$ 979.4	\$ 793.5	\$ 661.0
6%	\$ 2,506.4	\$ 1,626.2	\$ 1,186.5	\$ 923.1	\$ 747.8

Appendix

Appendix: SmartNIC Overview

SmartNIC Trends / Adoption and Relationship to VMW

SmartNIC v. Traditional NIC Overview



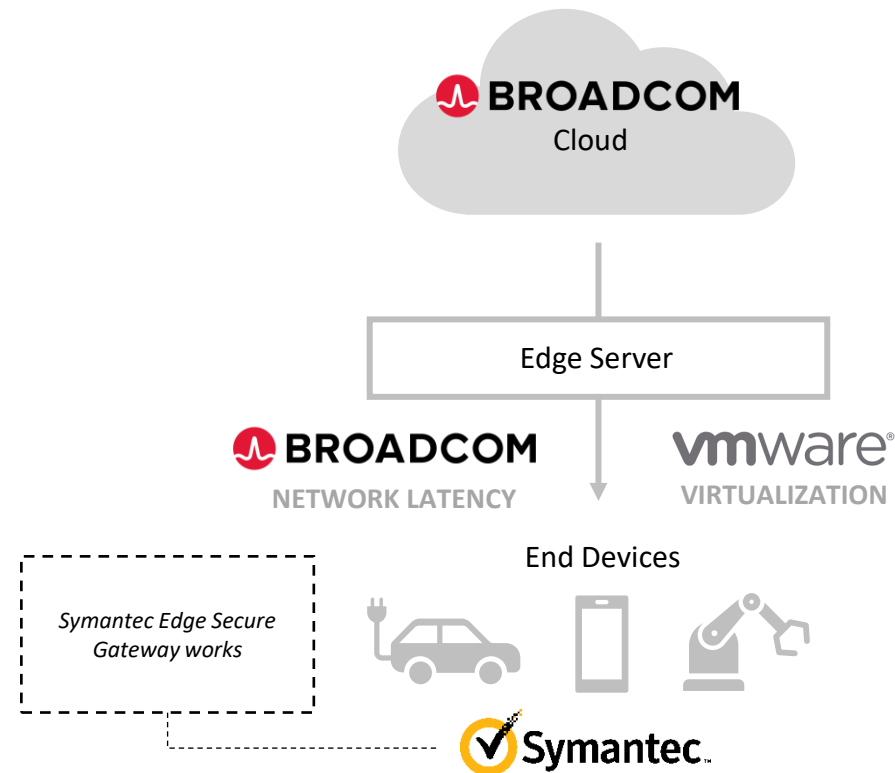
Commentary

- The SmartNIC builds off the traditional NIC; for context, NICs take form as boards / chips, and pair with computing systems to enable connectivity in internet-connected systems; SmartNICs are often used interchangeably with DPUs
- SmartNICs are expected to make up 38% of the network market by 2026 (42% est. CAGR)
- SmartNICs help offload networking, security and storage requirements, lowering latency and power consumption
- As VMW adds compatibility for SmartNICs / DPUs with older servers, adoption should increase significantly, allowing AVGO to capitalize on currently untapped demand
- SmartNICs will likely replace NICs over time as data center infrastructure faces strain from new technologies including AI/ML and as faster data (5G) access becomes a base offering

Appendix: Edge Computing Overview

Edge Computing Trends / Adoption and Relationship to VMW

Edge Computing Overview



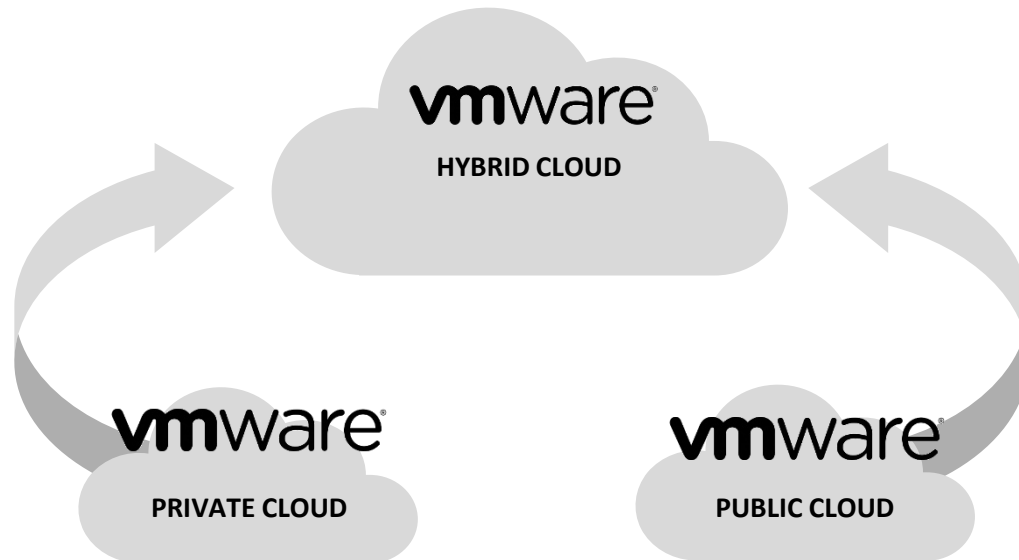
Commentary

- *Edge computing works closer to / at the device level to quickly analyze and process data in real-time; compared to cloud computing, low network latency is often a requirement for efficient device performance*
- *AVGO estimates that within the next three years, 75% of all data processed will occur at the edge*
- *Broadcom hardware already has a place in both cloud data centers and edge servers, especially regarding its networking and connectivity hardware*
- *VMWare can integrate with Broadcom and competitors' existing networking hardware (NICs, switches, etc.) to provide efficiencies to reduce latency as more edge servers enter the market*
- *Software from Symantec can further enable product optimization by delivering*

Appendix: Hybrid Cloud Overview

Hybrid Cloud Trends / Adoption and Relationship to VMW

Hybrid Cloud Overview



Commentary

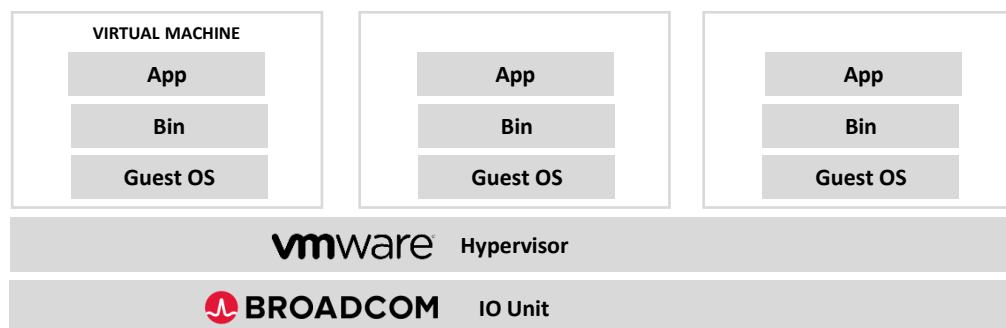
- *Hybrid / multi-cloud strategies, where organization utilize more than one cloud provider, are becoming more heavily adopted as organizations seek to better control IT costs, control, and operate more efficiently*
- *As of today, 80% of enterprises are using a multi-cloud strategy, with a majority also using more than three public cloud providers*
- *VMWare already has a strong footprint in hybrid & multi-cloud offerings, with its Cross-Cloud Services offerings providing accessibility for on-prem and public cloud infrastructures by offloading workloads across providers*
- *VMW would arguably allow AVGO to position itself as a “supercloud” provider, providing already well-adopted middleware on top of AVGO hardware solutions*

Appendix: Containerization Overview

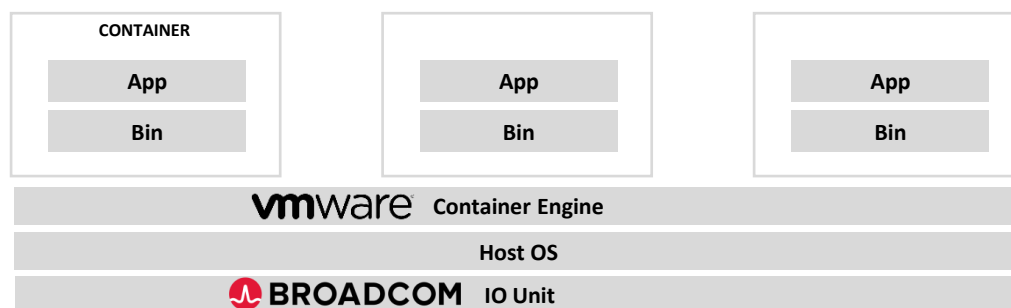
Containerization Trends / Adoption and Relationship to VMW

Containerization v. Virtualization

Virtualization



Containerization



Commentary

- As opposed to virtualizing the underlying hardware, containers virtualize the OS and are often used as an alternative to hardware virtualization software; many consider containers as “the VM killer”
- Traditionally, most applications used to be built directly on VMS; as VMW describes, “modern apps are built on containers... on VMs”
- VMW’s Tanzu product line de-risks the potential for broader/faster containerization adoption compared to “traditional” virtualization methods
- Tanzu harnesses the full power of Kubernetes, which comprises an estimated 99% of the cluster-management market, and complements other popular containerization tools such as Docker
- Overall, an acquisition of VMW ensures competitiveness in both general VM usage, in addition to providing customers a well-known solution for large-scale container need