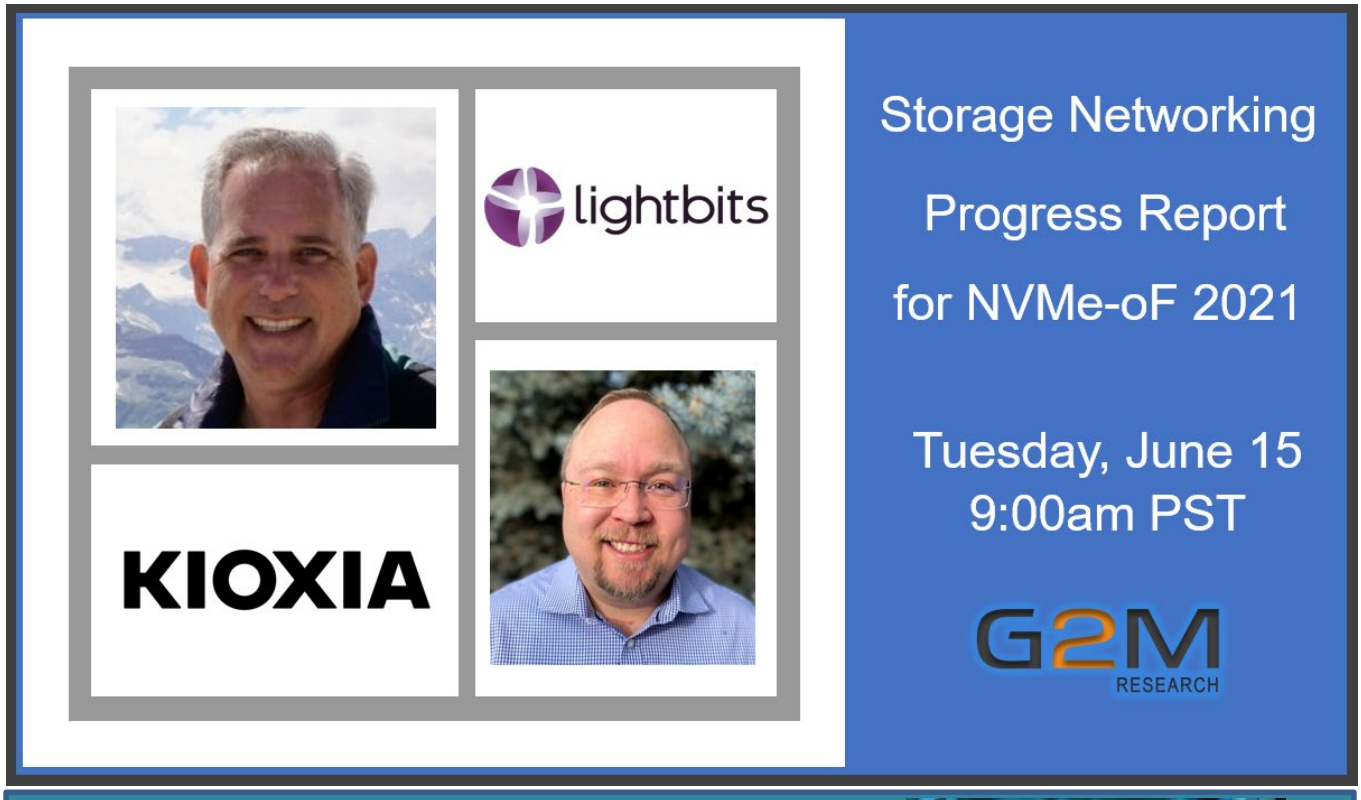
Highlights

Even as live, in-person conferences are coming back, the virtual conferences still remain attractive. Virtual conferences are an extremely cost-effective way to engage a worldwide audience of prospective customers, especially in light of global travel restrictions. The time and cost savings of attending multiple virtual conferences in any given week means higher engagement rates for these venues. For smaller companies and startups, being at a large show can be costly and challenging.

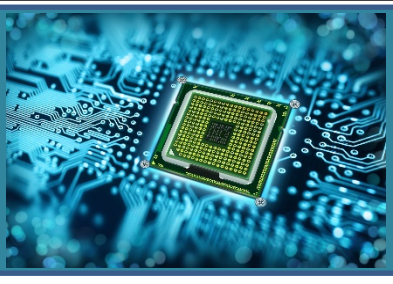
Our multivendor webinars are a good example of this. Vendors have the ability to engage hundreds of prospects at a substantive level. With the multivendor format, they also provide conversations that feel spontaneous, and a deep dialogue with each panelist having a solid opportunity to argue their perspective. Plus, the high-quality recorded webinar and slide deck remain available for use long after the event. If you are interested in sponsoring a webinar but don't see a topic that quite fits your needs, we can modify topics or add topics to meet your objectives. Our entire webinar schedule and other upcoming Enterprise Storage events are at the end of our newsletter.

And, as travel picks back up, remember to treat your airline personnel kindly. Of note, many airlines are **cutting back** on alcohol service to passengers in light of some recent in-flight **melees**.

Cheers! Mike Heumann



Got Chips?



COVID-19 forced the shutdown of processor plants. Restarting them and reestablishing supply chains is slow, resulting in a shortage of IT hardware, particularly semiconductor chips, and creating significant constraints on electronic equipment production. Experts estimate anywhere from six months to a few years before this production bottleneck is resolved. Think beach traffic, Orange County, Fourth of July weekend. The shortage is expected to cost the global automobile industry $110B in 2021 revenue.

Car manufacturers are cutting production including Ford F150, Ford Explorer, Jeep Grand Cherokee, Mercedes Benz C-Class. John Lawler, Ford CFO, says they have 22k cars that are partially built but missing parts, including the F150.

The Ford F-150 is most popular motor vehicle of all time. For over 30 years, the F-150 has been the best-selling vehicle in the United States. And, for more than 40 years, it has been the best-selling pickup truck.

Glenn O'Donnell, Vice President and Research Director at Forrester Research, does not expect an early end to the shortage: "At Forrester, we hadn't really paid much attention to the semiconductor market for many years. Frankly, the industry got pretty boring. It revolved a lot around microprocessors, and the mainstay for those products was a ping-pong battle between Intel and AMD. Then things changed … in a big way. People learned that GPUs were useful for processing AI workloads that were in high demand. Around the same time, mobile phones became much more powerful, catapulting the ARM architecture from a quaint toy to become a real threat. Meanwhile, the internet of things became a reality, fueled by a rapid improvement in price-performance ratios on the chips. These dynamics generated a flurry of M&A activity in the chip industry, and suddenly, this is a very interesting space again! First, NVIDIA announced it will acquire Arm, then AMD said it will buy Xilinx. More recently, Intel brought back one of its former stars to lead as CEO, AMD announced its powerful new family of EPYC processors, Intel launched its new Xeon around the same time, and NVIDIA just announced Grace, its new CPU-GPU combo."

Intel has committed $20B to building two new fabs in Chandler, Arizona. President Biden initiated a 100-day review of critical supply chain issues to determine the actions necessary to enhance manufacturing capacity. The CHIPS Act established investments and incentives to support US semiconductor manufacturing, research and development, and supply chain security. Stakeholders across all industry sectors are pushing for full funding of the Act. Biden's infrastructure plan includes $50B for the semiconductor industry.

This chip shortage highlights a major infrastructure problem for the US – 75% of semiconductors are manufactured in Asia. Twenty-five years ago, the US produced 37% of the world's semiconductor manufacturing in the US but today only produces 12%.

Pat Gelsinger, Intel's new CEO, says Intel missed a huge opportunity when Steve Jobs needed chips for his iPhone and Intel declined. Apple went to TSMC, today's the world's most advanced chip-manufacturer. And, while Intel is investing deep to catch up, TSMC announced they will spend $100B, including investment in a new fab in Phoenix to meet Apple's needs.

"*Making a chip is one of the most, if not the most, capital – and R&D-intensive manufacturing process on earth. The fabrication is intricate and requires highly specialized inputs and equipment to achieve the needed precision at miniature scale. There can be up to 1,400 process steps (depending on the complexity of the process) in the overall manufacturing of just the semiconductor wafers alone. And each process step typically involves the use of a variety of highly sophisticated tools and machines. In short, making semiconductors is exceedingly hard and, therefore, takes time.*"

Falan Yinug, Director of Industry Statistics and Economic Policy, SIA

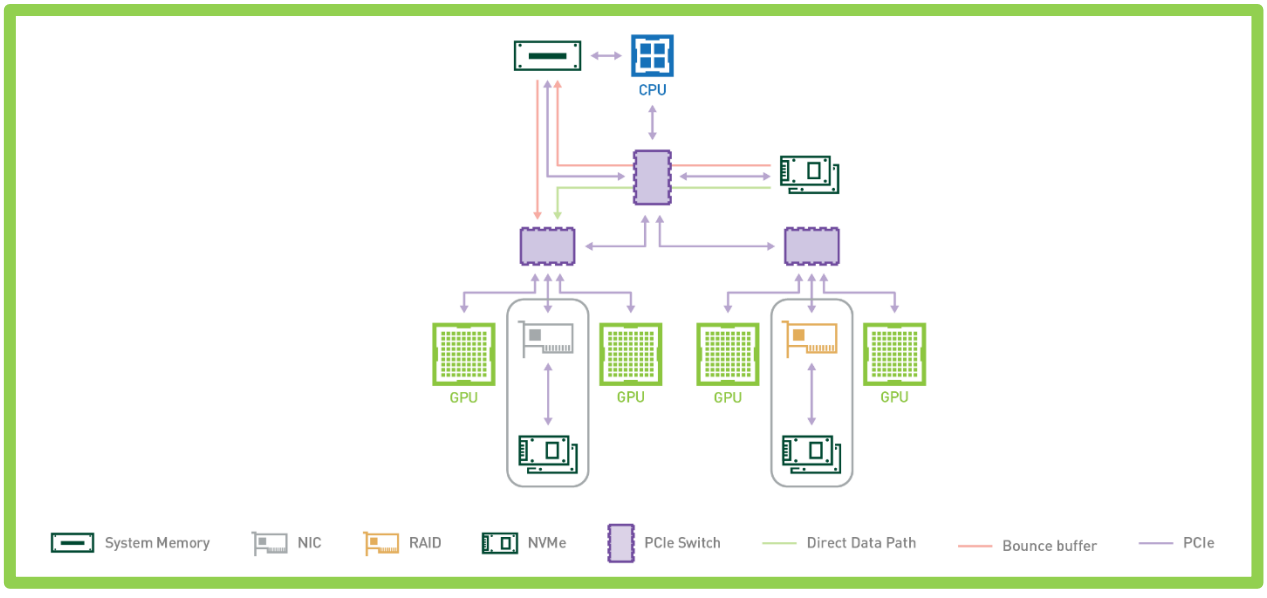
VAST Data Predictions for 2021 – Hitting the Mark?

We are halfway into 2021 and it is interesting to note whether industry movement matches expectations. Sometimes, that becomes a self-fulfilling prophecy. Obviously, companies invest where they expect to see results. Interesting blog, "VAST Data 2021 Predictions: Rethinking Cloud, AI, and Healthcare", by their Founder and CEO, Renen Hallak:

It has been a turbulent year for companies and industries of all kinds as they've rapidly had to adapt to the new normal of COVID-19, from the way teams work together to how organizations engage with customers to advancing critical research in the fight against the virus. At the heart of these efforts has been the increasingly growing value of data, and the amount of it. But datasets are only as good as the way you manage and scale them to drive innovation, whether that's for enhanced AI, or discoveries and breakthroughs in life sciences and healthcare. Regardless, the ripple effects of COVID-19 and the general evolution of emerging technologies have taught entire industries valuable lessons that are sure to be implemented in 2021 and beyond.

The Cloud Tax Triggers the Cloud Tea Party Companies that began their cloud journeys four to five years ago are now refactoring their strategies. The multi-year agreements customers made have now begun to mature, and as organizations weigh their alternatives, 2021 will be a reconciliation against the tax that cloud vendors level against customers versus being able to build on-premise. Many cloud vendors have held the line on pricing during periods of extreme HW cost reductions (example: Amazon S3) such that the initial economic calculus no longer works. In 2021, customers who operate at scale will make bold moves back on-prem as they have now realized that shifting costs between OPEX and CAPEX results in the same total spend. And, while time is money and cloud provides agility, money is also money. When the comparable costs are 15x-30x more than what customers pay on-prem, the economics can't be ignored.

Legacy NAS is Dead for AI With the introduction of PCIe Gen4, I/O rates have now completely broken away from CPU core evolutions. Legacy NFS providers are stuck with single-stream TCP that is rate-limited by the capability of a single CPU core on the application server. PCIe Gen4 will double the peak I/O performance of applications in 2021, while a CPU core will no longer be able to equally double single-core I/O performance. There is no greater concentration of single-host IO than in the AI market - for applications such as machine learning and deep learning.

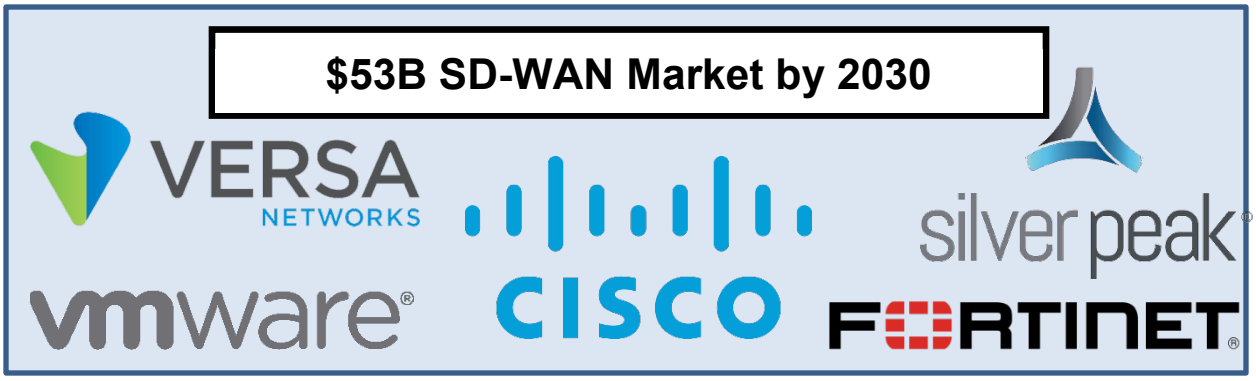


To resolve this, customers will seek solutions that support multi-threading, RDMA, and the ability to bypass CPUs altogether - as is the case with NVIDIA's GPUDirect Storage (We added the image, the RAID card is a prototype). The demands to keep GPUs and AI Processors fed and efficient will dramatically outstrip the I/O capabilities of legacy TCP-based NAS, leading customers to walk away from legacy NAS altogether in 2021.

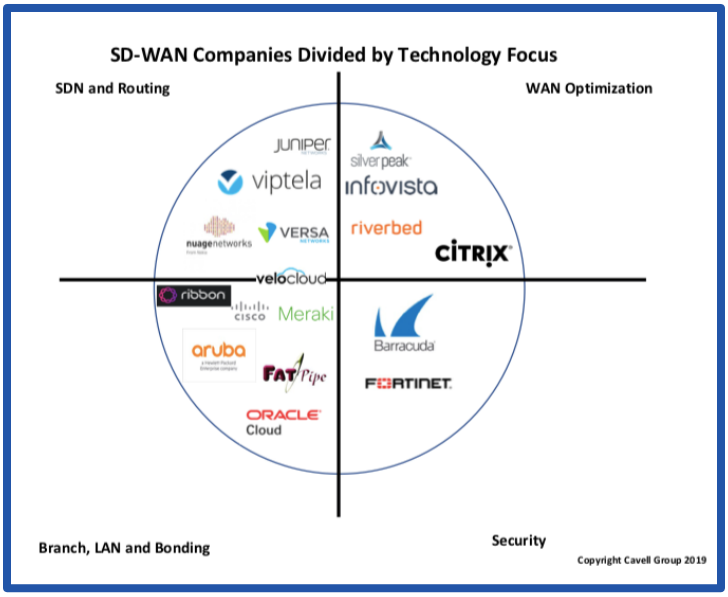
Standards Become Even More Important in 2021 for ML/AI AI compute vendors will further push to homogenize standards across the market to make way for framework compatibility. In their quest to open up the TAM for accelerated computing, the need for standard programming environments and I/O stacks will only increase. The explosion of ML/AI-tuned silicon will force the industry to adopt a standardized storage presentation to a common hardware environment. Storage-wise, while NAS has an appeal as NFS is also a standard, standard NFS optimizations in the kernel such as RDMA and multi-path will be table stakes to marry the performance needs with the push to standardize.

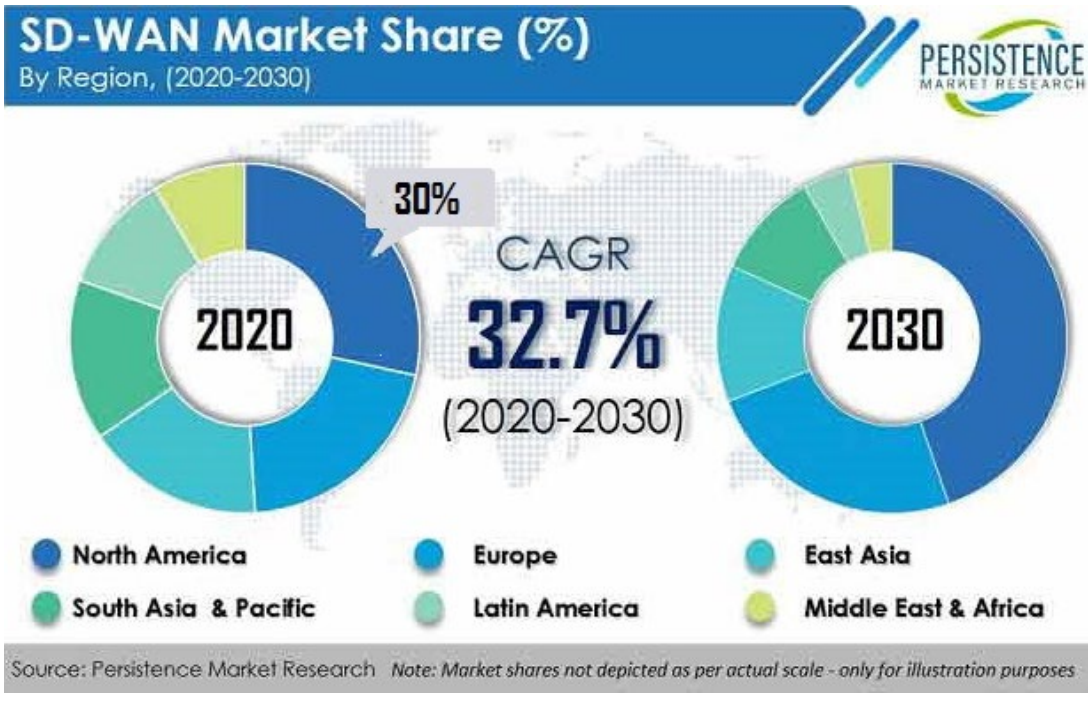
The Healthcare Industry Walks Away from the Hard Drive Healthcare will be the first industry to go all-in on flash, moving away completely from traditional tiered storage. They learned a hard lesson this year as they raced for the researching, testing, manufacturing, vaccinating, deployment, and calculating answers that the world needed. The problems with tiered storage show up most prominently at scale with analytics. These critical data sets now have a value that is proportionate to their size, which throws the value of storage tiering out the window. 2020 proved that our front-line systems could not deal with the latency of mechanical media, and low-cost flash price points are now compelling enough that organizations no longer need to choose between performance and budget.

A Modernized 2021 and Beyond With the pandemic continuing into 2021, the next 12 months will again provide uncertainty for many organizations. But companies and entire industries continue to make the necessary investments in the modernization of their infrastructure and core technologies - much of which comes from lessons learned in 2020. As they do so, they will be more suited to not only handle any turbulent months ahead but will set themselves up to be innovators in their field for years to come.

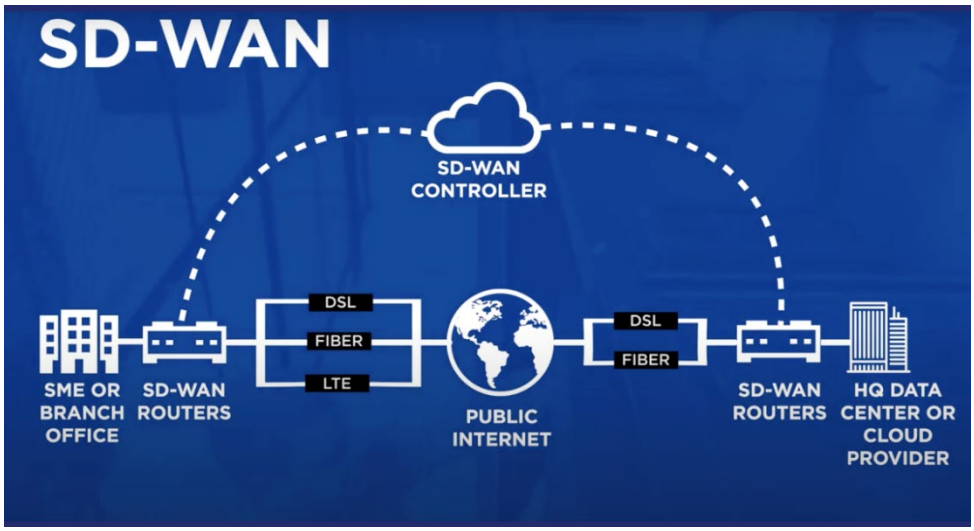


Persistence Market Research report indicates SD-WAN market growth reaching $53M by 2030. The top five vendors in revenue share for the full-year 2020 were led by Cisco, followed by VMware, Fortinet, Versa and HPE/Silver Peak and account for nearly 2/3rds of the market. Top reasons for adoption include auto-failover and redundancy (66.8%), simplified management (61%), and cost savings over MPLS (57.7%). Many companies find the lack of bandwidth penalties and increased scalability better than the MPLS limitations. Remote work has contributed to the move to SD-WAN. Retail may provide a new opportunity for SD-WAN as there is a new to lower operational and capitalize expenses and creative solutions like virtual fitting rooms are used to capture customers.



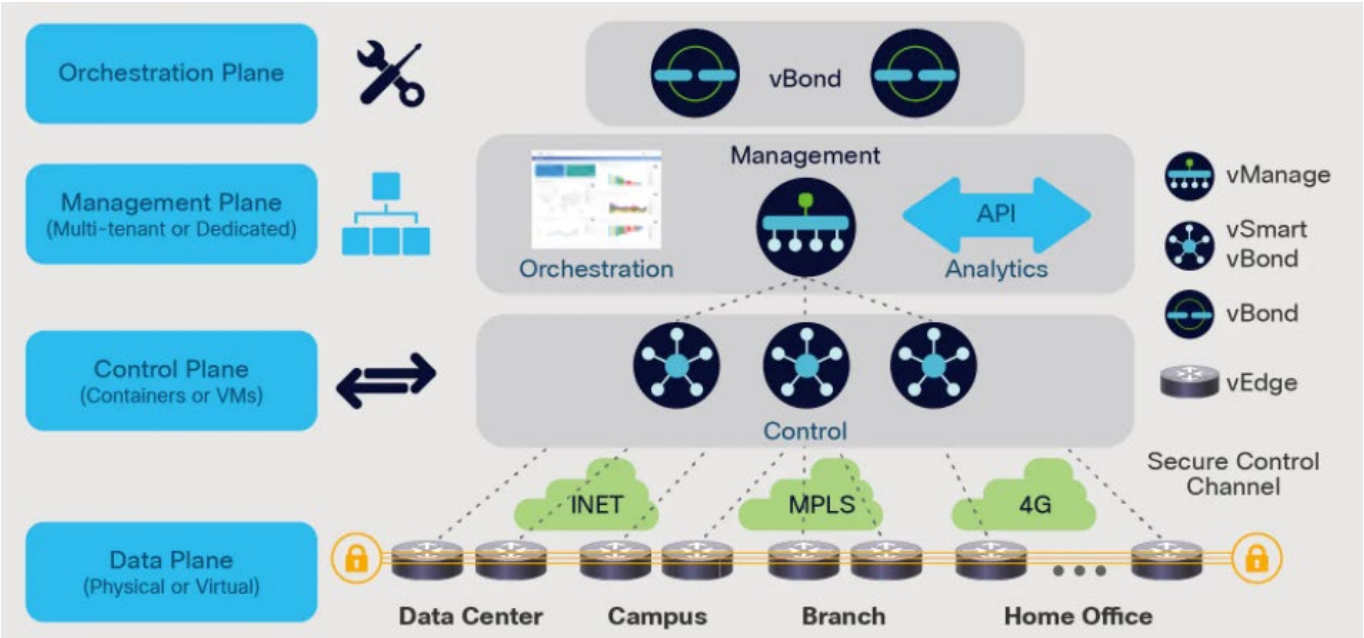


SD-WAN centralizes control over network traffic and directs it throughout the WAN to optimize performance. SD-WAN is highly agile and supports connection types ranging from MPLS and DSL cable to LTE.



SD-WAN Benefits include 1) lower WAN OpEx, CapEx, and overall total cost of ownership, 2) greater business agility and responsiveness to keep pace with IT innovations, 3) supports multiple, secure, high-performance connections, eliminating backhaul penalties imposed by MPLS networks, 4) improves performance by enabling load sharing across connections and adjusting traffic flows based on network conditions, 5) supports the automated provisioning of, and changes to, premium network services such as VPNs, firewalls, security, WAN optimization, and application delivery control, 6) supports zero touch provisioning (ZTP), and 7) improves network security by encrypting WAN traffic and segmenting the network to minimize damage if breaches occur.

Cisco SD-WAN solutions:



Storage Architectures that Maximize the Performance of HPC Clusters

with sponsors KIOXIA, NVIDIA, and WekaIO

To what extent is your organization utilizing HPC concepts and architectures (check one):

We use HPC concepts & architectures **widely** in our business/org	27%
We have **several** problem domains which utilize HPC concepts	10%
We have **a few** problem domains which utilize HPC concepts	12%
We are studying the use of HPC concepts & architectures for new workloads, but have not yet implemented any HPC solutions	22%
We **do not plan** on utilizing HPC concepts or architectures in our organization in the near future	10%
Don't know	20%

When looking at implementing HPC storage solutions, who do you look to for guidance on hardware and software choices (check all that apply):

My current IT server vendor(s)	11%
My current IT storage vendor(s)	19%
My current IT integrators	8%
HPC hardware and software vendors	38%
HPC application providers/integrators	22%
Other	19%

G2M Research Multi-Vendor Webinar Series

Our two May webinars included "Responsive and Efficient Storage Architectures for Cloud Service Providers" on May 18 with sponsors Pliops (Steve Fingerhut), NVIDIA (Rob Davis), Excelero (Kirill Shoikhet) and "How to Take a 360 Degree View of Your Organization's Cybersecurity" and May 25 with sponsors Security Scorecard (Shaun Walsh) and Crowe (Morgan Strobel and Jill Czerwinski).

View the recording for "Responsive and Efficient Storage Architectures for Cloud Service Providers" here and/or download a PDF of the slides. View the recording for "How to Take a 360 Degree View of Your Organization's Cybersecurity" here and/or download a PDF of the slides.

Our webinar schedule is below- Click on any of the topics to get more information about that specific webinar. Interested in Sponsoring a webinar? Contact **G2M** for a prospectus.

You can view all our webinars and access the slide deck presentations.

June 15:	It's 2021 - Where Has NVMe-oF™ Progressed To?
July 13:	Computational Storage vs Virtualized Computation/Storage in the Datacenter: "And The Winner Is"?
Aug 17:	AI/ML Storage - Distributed vs Centralized Architectures
Sept 14:	Composable Infrastructure vs Hyper-Converged Infrastructure for Business Intelligence
Oct 12:	Cloud Service Providers: Is Public Cloud, Private Datacenter, or a Hybrid Model Right for You?
Nov 9:	The Radiometry Data Explosion: Can Storage Keep Pace?
Dec 14:	2021 Enterprise Storage Wrap-up Panel Discussion

Enterprise Storage Events – All Virtual

June 14-16	SYSTOR 2021
June 16-17	Cloud Expo Europe
June 16-19	Viva Technology
June 17	Dublin Tech Summit
June 21-23	ConnectWise IT Nation Secure
June 22-24	HPE Discover
June 28	MWC Barcelona 21
July 3	Women, Tech, and the Global Good
July 20-21	Gartner Tech Growth & Innovation