

Is Virtualization Really the Key to Scalability?



Stan Moote *CTO* 





Thomas Burns *CTO* 





Andy Rayner Chief Technologist









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## IABM SPECIAL REPORT IBC 2019

Analysis giving an invaluable briefing on, and analysis of, the key trends that are driving change in the broadcast and media industry.

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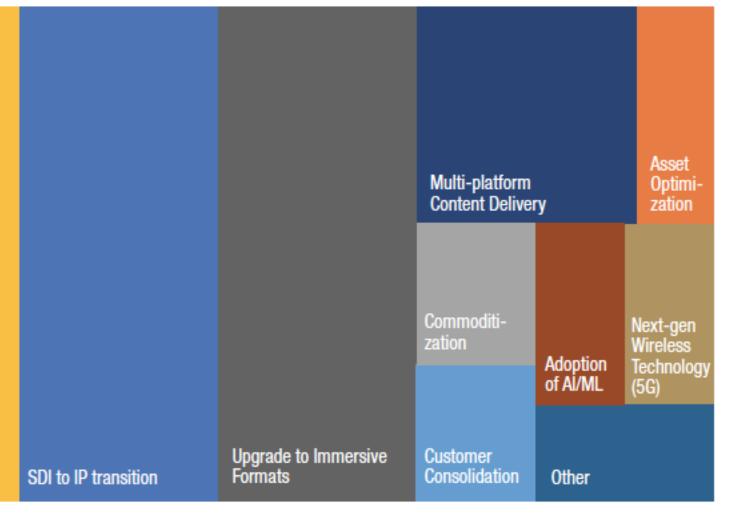
#### THE BaM® CONTENT CHAIN

from Creator to Consumer

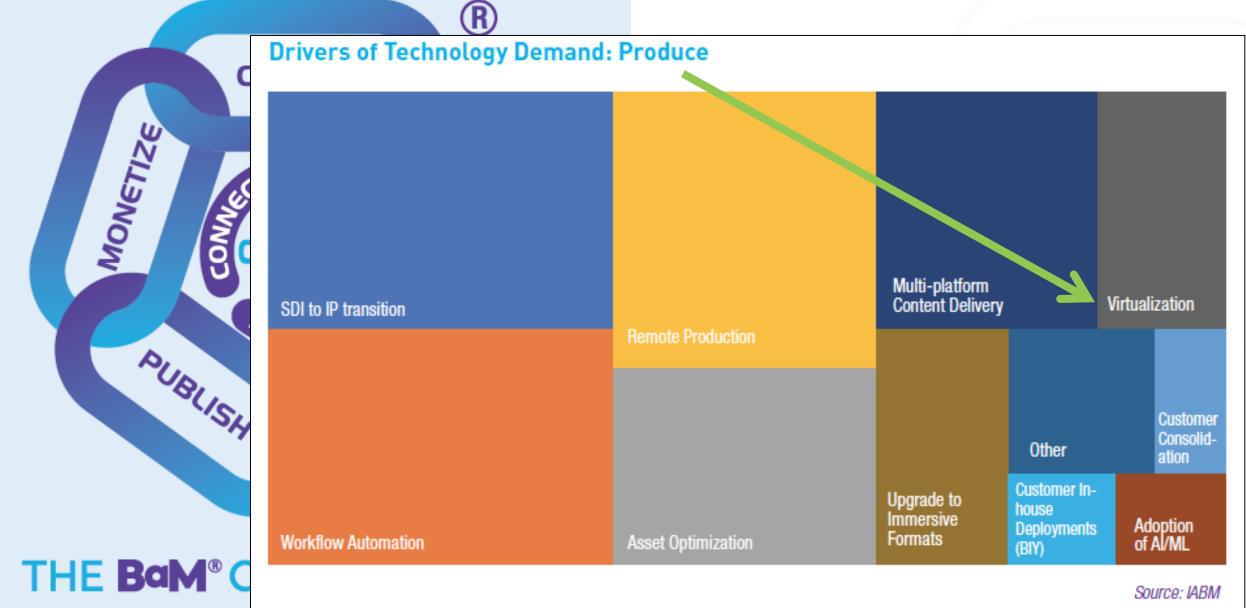




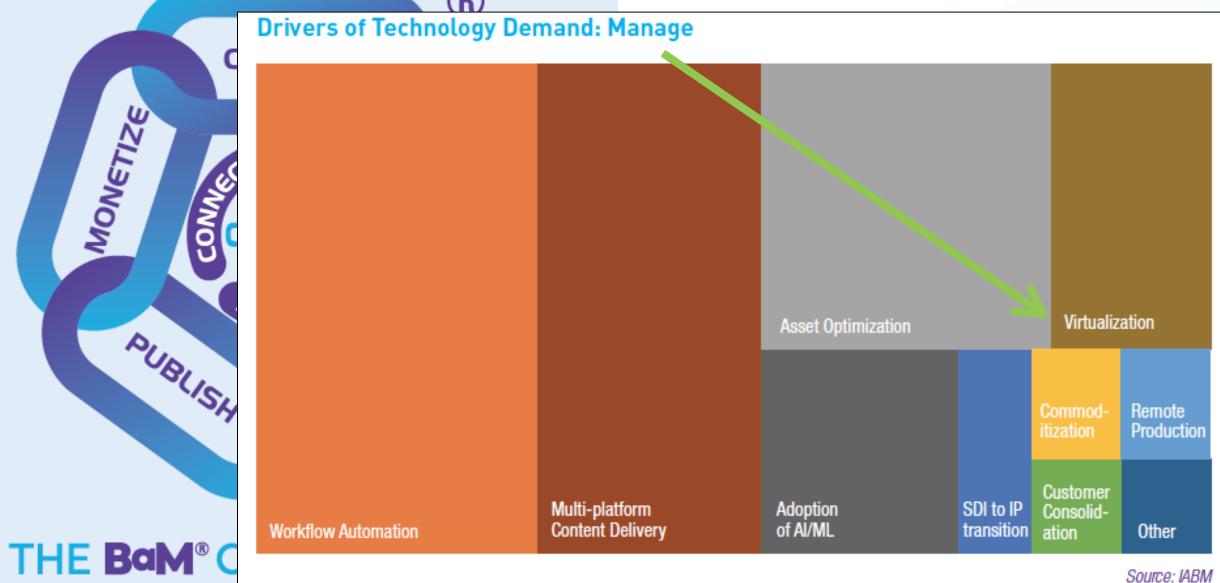
#### **Drivers of Technology Demand: Create**



Source: IABM



from Creator to Consumer

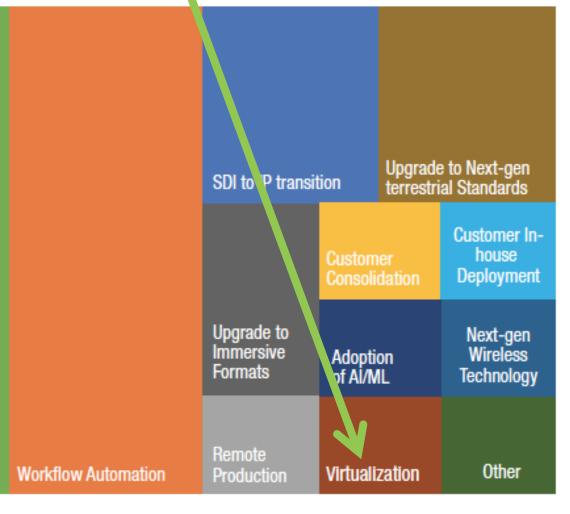


from Creator to Consumer



#### Most Important Drivers of Technology Demand: Publish

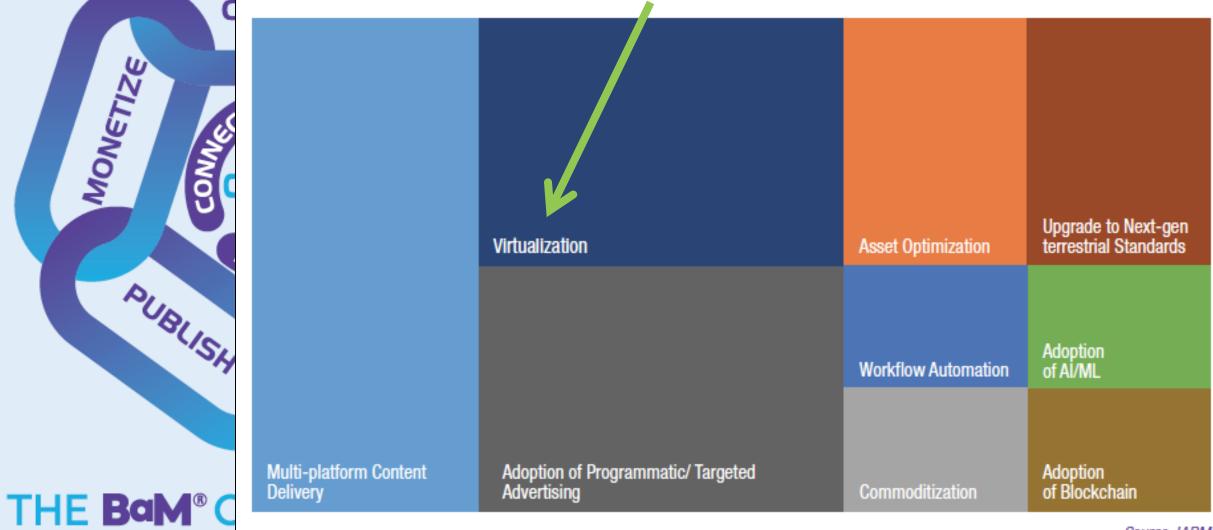
Multi-platform Content Delivery



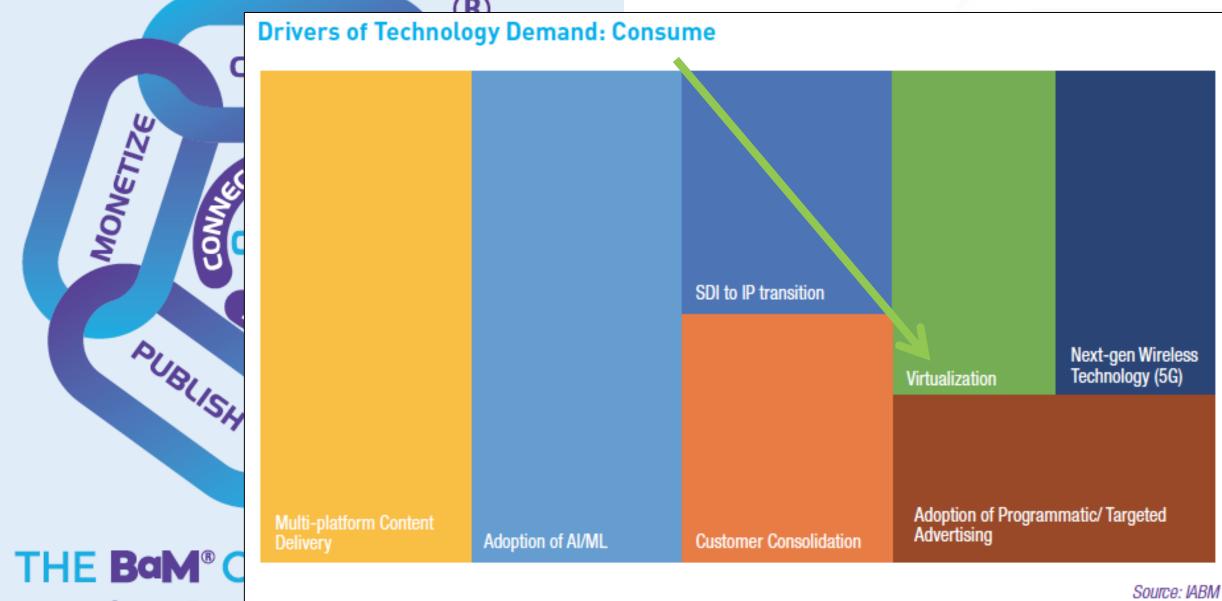
Source: IABM



#### **Drivers of Technology Demand: Monetize**



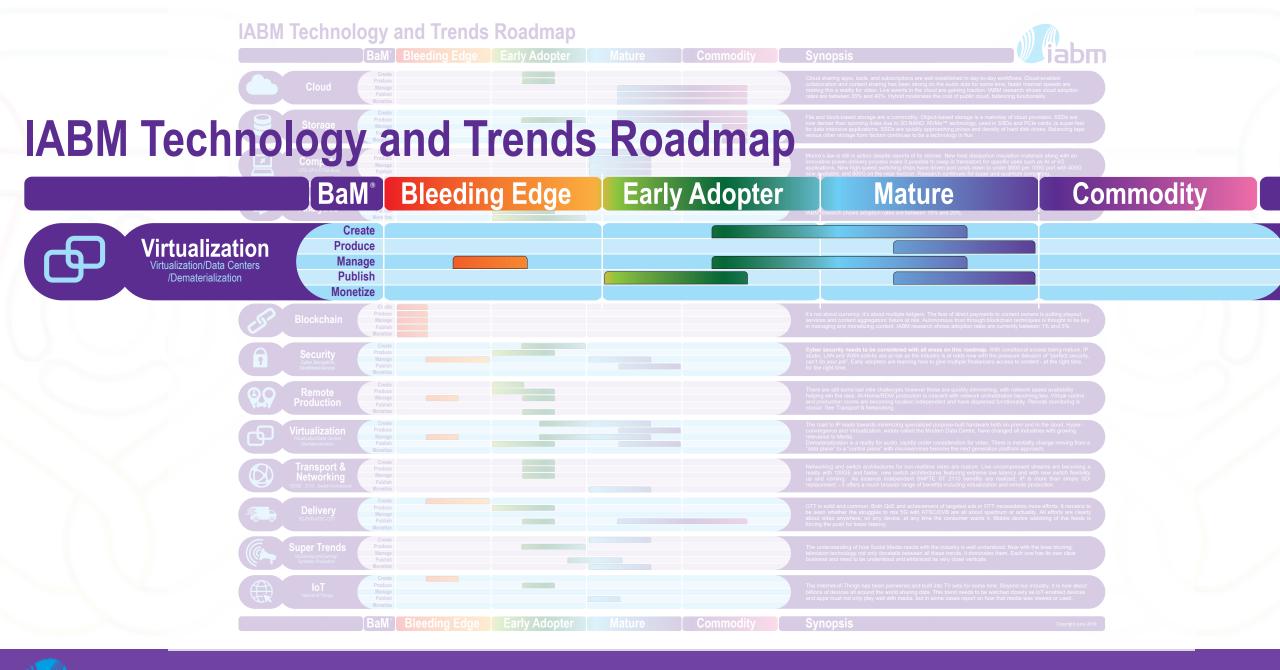
Source: IABM



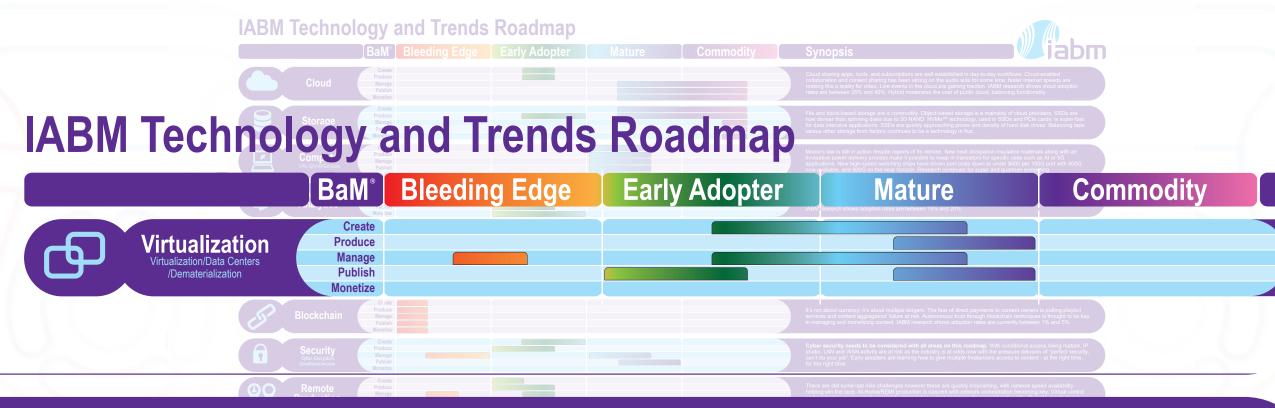
#### IABM Technology and Trends Roadmap BaM® Bleeding Edge Early Adopter Mature Commodity **Synopsis** Cloud sharing apps, tools, and subscriptions are well established in day-to-day workflows. Cloud-enabled collaboration and content sharing has been strong on the audio side for some time, faster Internet speeds are making this a reality for video. Live events in the doub are gaining traction. NBM research shows cloud adoption rates are between 35% and 40%. Hybrid moderates the cost of public cloud, balancing functionality. Produce Cloud Manage File and block-based storage are a commodity. Object-based storage is a mainstay of cloud providers. SSDs are now denser than spinning disks due to 3D NAND. NVNe<sup>11</sup> technology, used in SSDs and PCle cards, is super-fast for data intensive applications. SSDs are quickly approaching prices and density of hard disk drives. Balancing tape versus other storage form factors continues to be a technology in flux. Produce Storage Publish Moore's law is still in action despite reports of its demise. New heat dissipation insulation materials along with an innovative power-delivery process make it possible to swap in transistors for specific uses such as AI or SG applications. New high-speed switching chips have driven port costs down to under \$600 per 100G port with 400G now available, and 800G on the near hotizon. Research continues for super and quantum computing. Compute Publish Beyond speech-to-text and facial recognition, we are still in the hype stage for the industry. Al/ML-Analytics is faced AI/ML-Produce with confirmation bias issues while developing training sets and algorithms. Smart Metadata is rapidly changing cost/ benefit balance between access and storage. Intelligent emotional search engines are aiding in the editing process. IABM research shows adoption rates are between 15% and 20%. **Analytics** Produce The consumer side still continues to drive more pixels. 4K is routine in many form factors with 8K cameras now down Imaging to a practical size. Outside of acquisition and production, new imaging techniques aren't mainstream. With the drive for "better pixels" rather than more pixels, HDR, WCG and HFR are gaining traction as a result. Struggling with business models nevertheless immersive technologies are strong for gaming and verticals outside of the outdeast and media industry, which are taking advantage our industry's imaging technologies. Object based immersive audio techniques are taking audio to the next level. Produce **Immersive** Manage Produce It's not about currency, it's about multiple ledgers. The fear of direct payments to content owners is putting playout services and content aggregators' future at risk. Autonomous trust through blockchain techniques is thought to be key in managing and monetizing content. IABM research shows adoption rates are currently between 1% and 5%. **Blockchain** Manage Publish Cyber security needs to be considered with all areas on this roadmap. With conditional access being mature, IP studio, LAN and WAN activity are at risk as the industry is at odds now with the pressure delusion of "perfect security, can't do your job". Early adopters are learning how to give multiple freelancers access to content - at the right time, for the right time? Produce Security Manage Publish There are still some last mile challenges however these are quickly diminishing, with network speed availability helping win the race. At-Home/REMI production is nascent with network orchestration becoming key. Virtual control and production rooms are becoming location independent and have dispersed functionality. Remote monitoring is crucial. See Transport & Networking. Remote Manage Production The road to IP leads towards minimizing specialized purpose-built hardware both on-prem and in the cloud. Hyper convergence and Virtuation, widely called the Modern Data Centre, have changed all industries with growing relevance to Media. Produce Virtualization Dematerialization is a reality for audio, rapidly under consideration for video. There is mentality change moving from a "data plane" to a "control plane" with microservices become the next generation platform approach. Publish Networking and switch architectures for non-realtime video are mature. Live uncompressed streams are becoming a reality with 1005E and faster, new switch architectures featuring extreme low latency and with new switch flexibility up and coming. As essence independent SMPTE ST 2110 benefits are realized. Pis more than simply SDI replacement – it offers a much broader range of benefits including virtualization and remote production. Transport & Produce Networking Monetize OTT is solid and common. Both QoE and achievement of targeted ads in OTT necessitates more efforts. It remains to be seen whether the struggles to mix 50 with ATSC/DVB are all about spectrum or actuality. All efforts are clearly about video anywhere, on any device, at any time the consumer wants it. Mobile device watching of live feeds is forcing the push for lower latency. Produce Delivery **Super Trends** Produce The understanding of how Social Media reacts with the industry is well understood. Now with the lines blurring, television technology not only dovetails between all these trends, it dominates them. Each one has its own clear business and need to be understood and embraced as very close verticals. Manage Publish Produce The Internet-of-Things has been pioneered and built into TV sets for some time. Beyond our industry, it is now about loT Manage billions of devices all around the world sharing data. This trend needs to be watched closely as IoT-enabled devices and apps must not only play well with media, but in some cases report on how that media was viewed or used. Publish Bleeding Edge Early Adopter Mature Commodity Synopsis





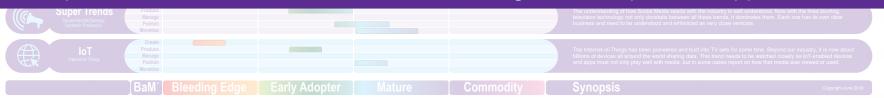






The road to IP leads towards minimizing specialized purpose-built hardware both on-prem and in the cloud. Hyper-convergence and Virtualization, widely called the Modern Data Centre, have changed all industries with growing relevance to Media.

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### Is Virt Scalab



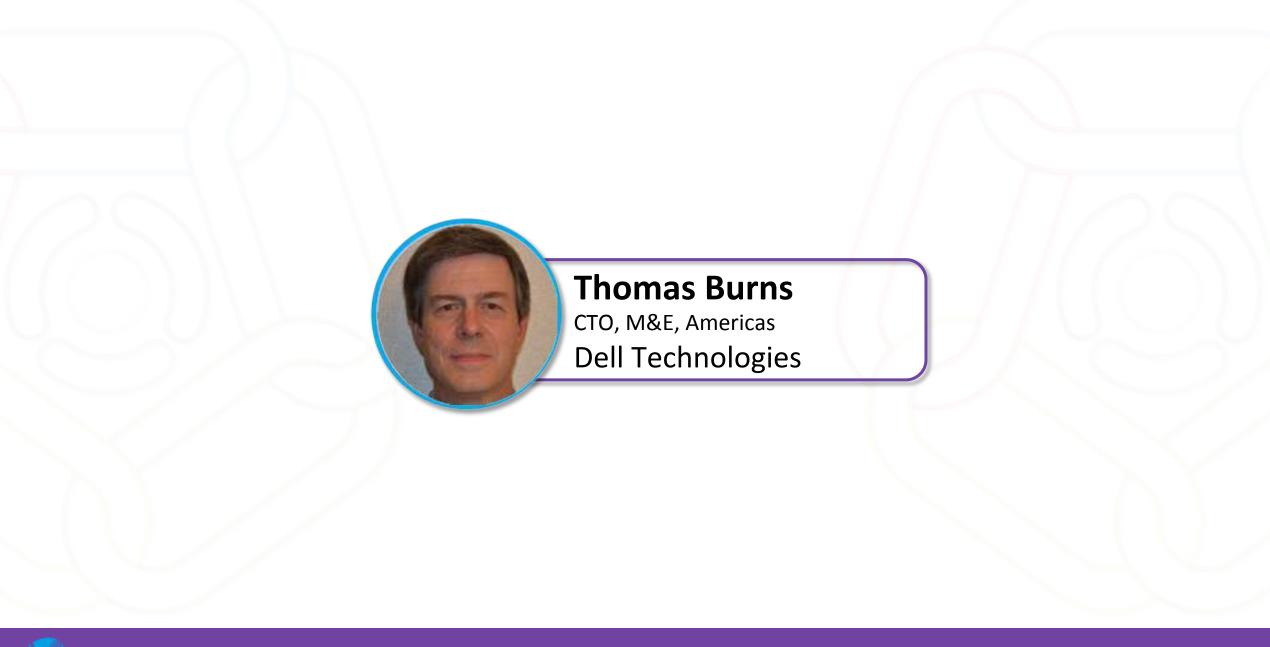
Stan Mo *CTO* 





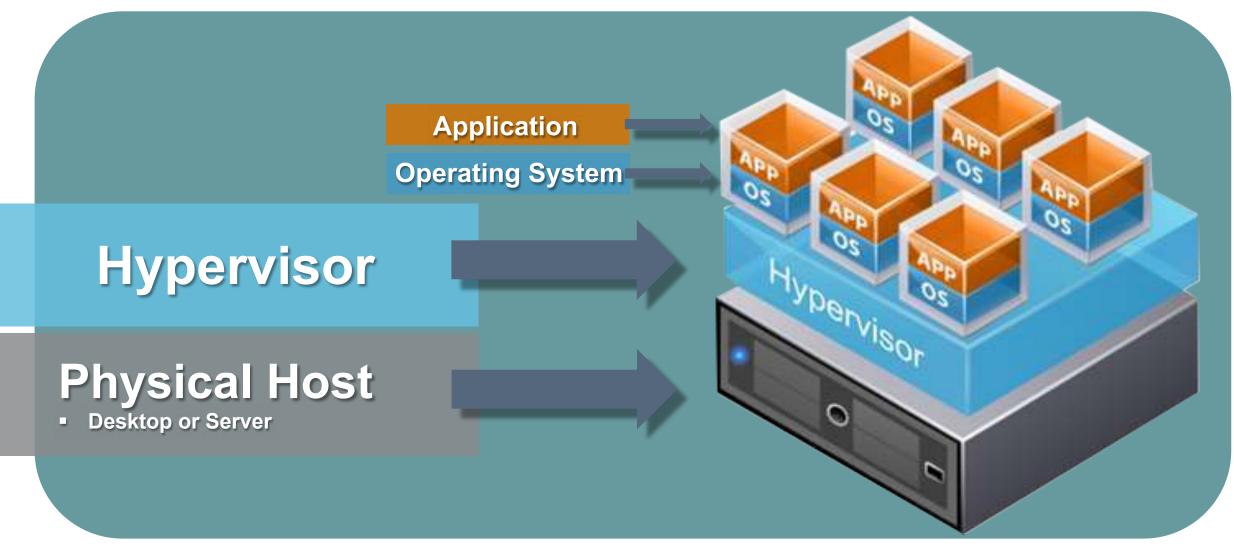








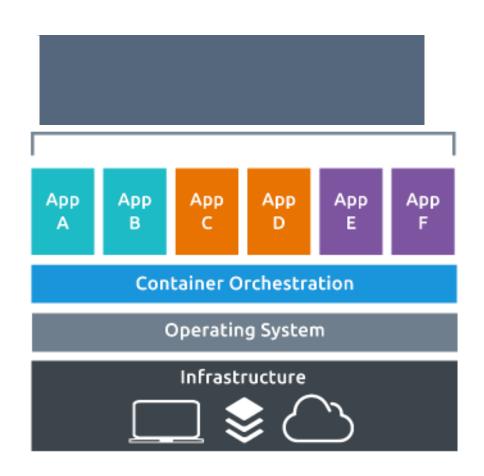
## Virtual Architecture

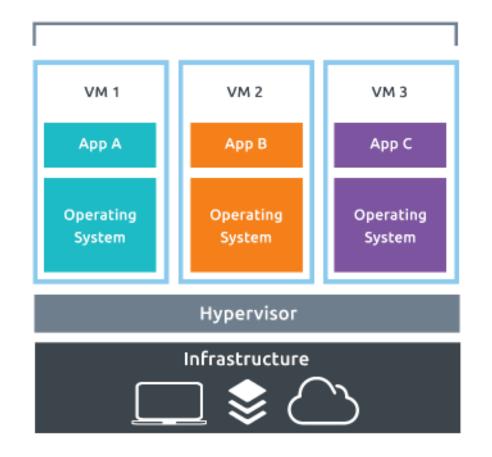






### Containers ≠ VMs





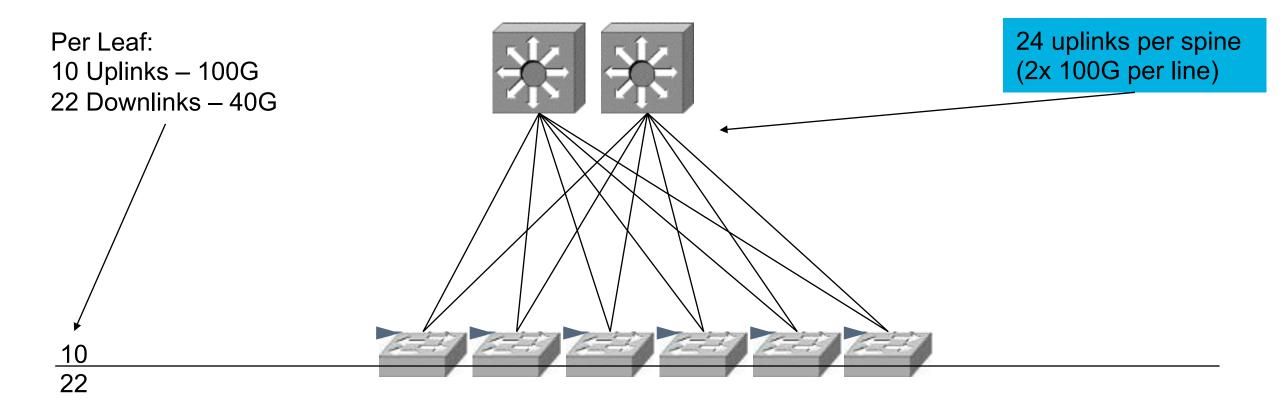
**Containerization** 

**Virtualization** 





#### Scaling Networks without Virtualization: 132 ports of Leaf-Spine

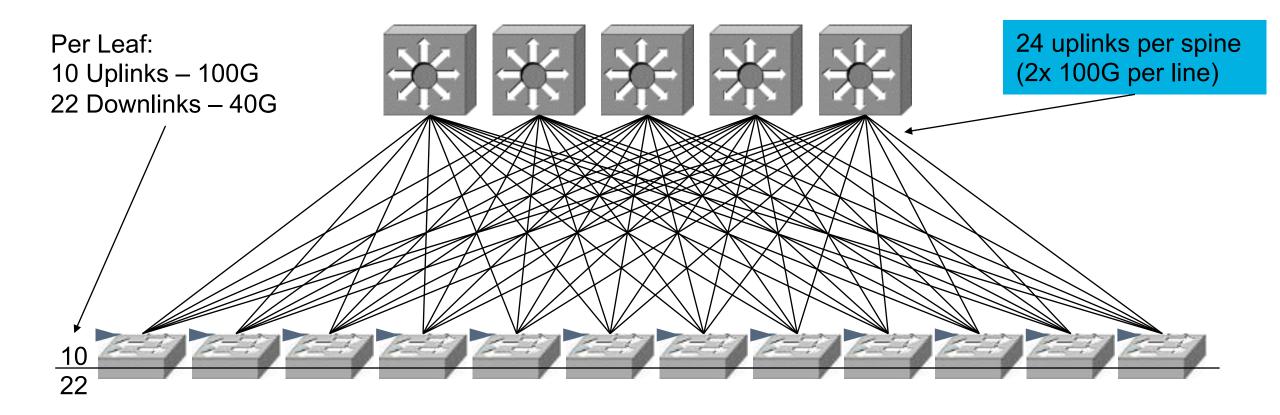


132 ports requires 2 Spine and 6 Leaf switches





#### Scaling Networks without Virtualization: 264 ports of Leaf-Spine

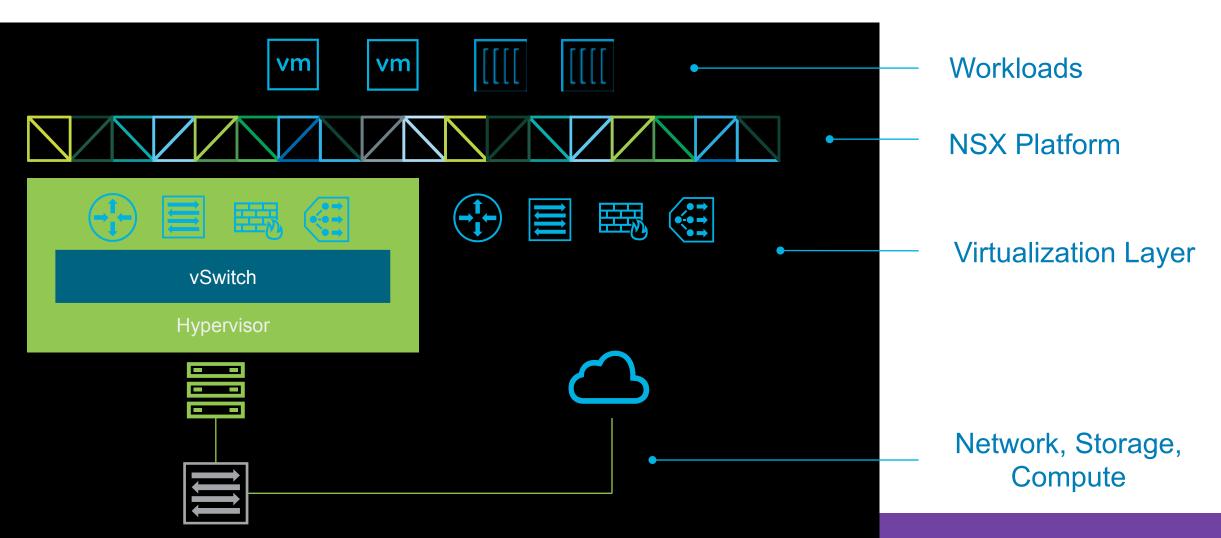


264 ports requires 5 Spine and 12 Leaf switches



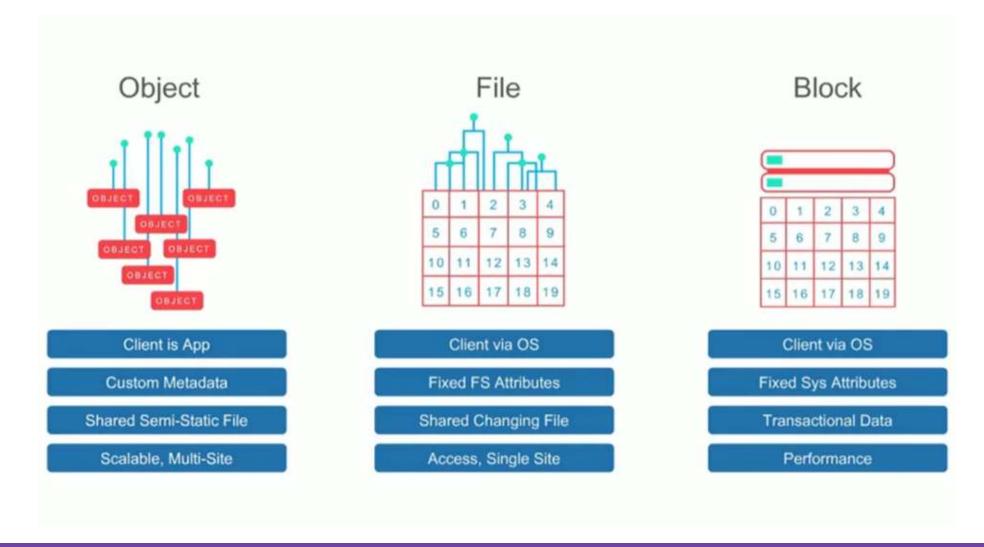






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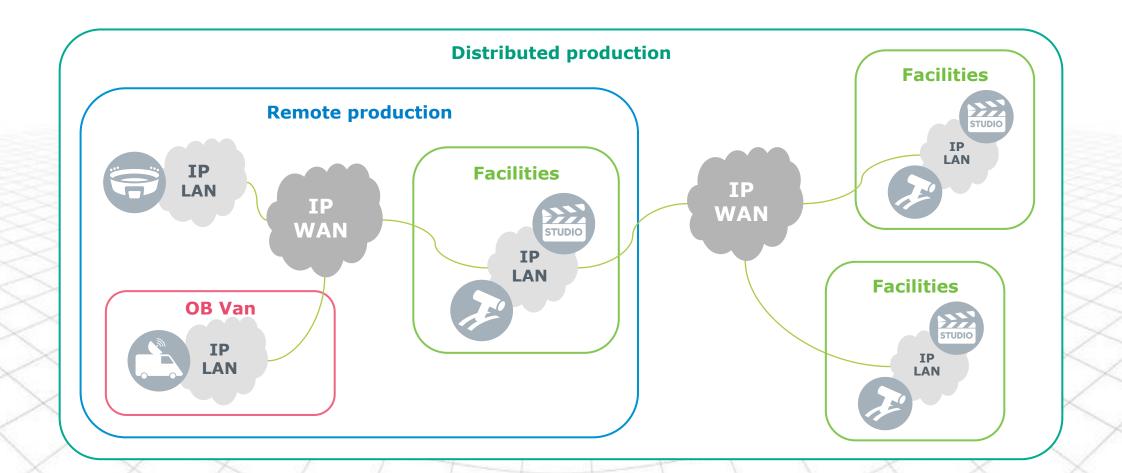
## Scaling Block, File and Object storage















#### **VideoIPath Virtualization Orchestrator**



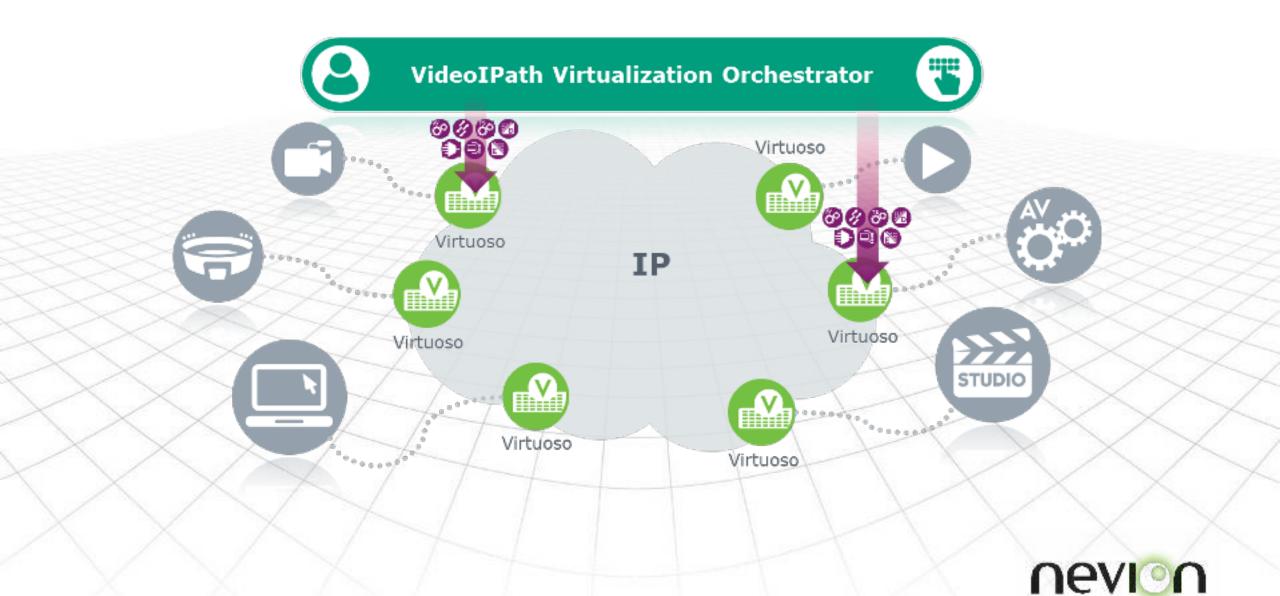








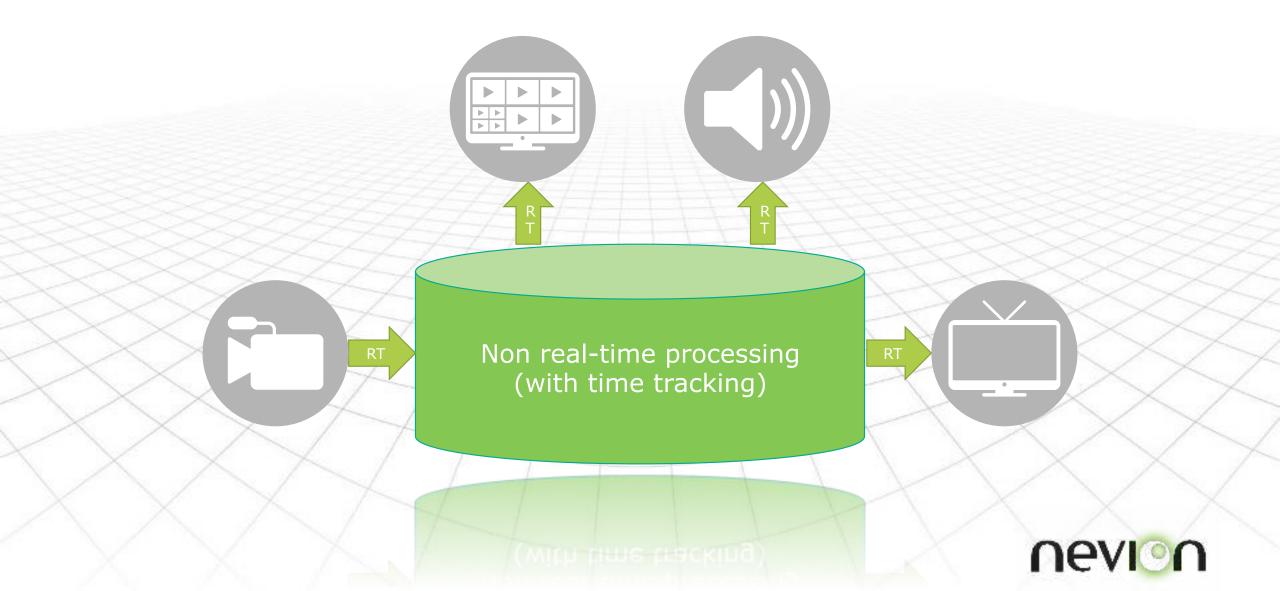
### Virtualizing the Media Functions



## LAN/WAN convergence



## Complete end to end IP workflow



## SMPTE ST 2110 + NMOS



SYSTEM -10



VIDEO -20



AUDIO -30



AES3-32 bit AUDIO -31



ANCILLARY DATA -40



TIMING -21



COMPRESSED VIDEO -22



MULTI-PART VIDEO -23



SD <u>VIDEO</u> -24



FAST METADATA -41



FMX -42



2022-8 COMPOSITE



**BCP-00 3-0x**Security
suite

IS-04
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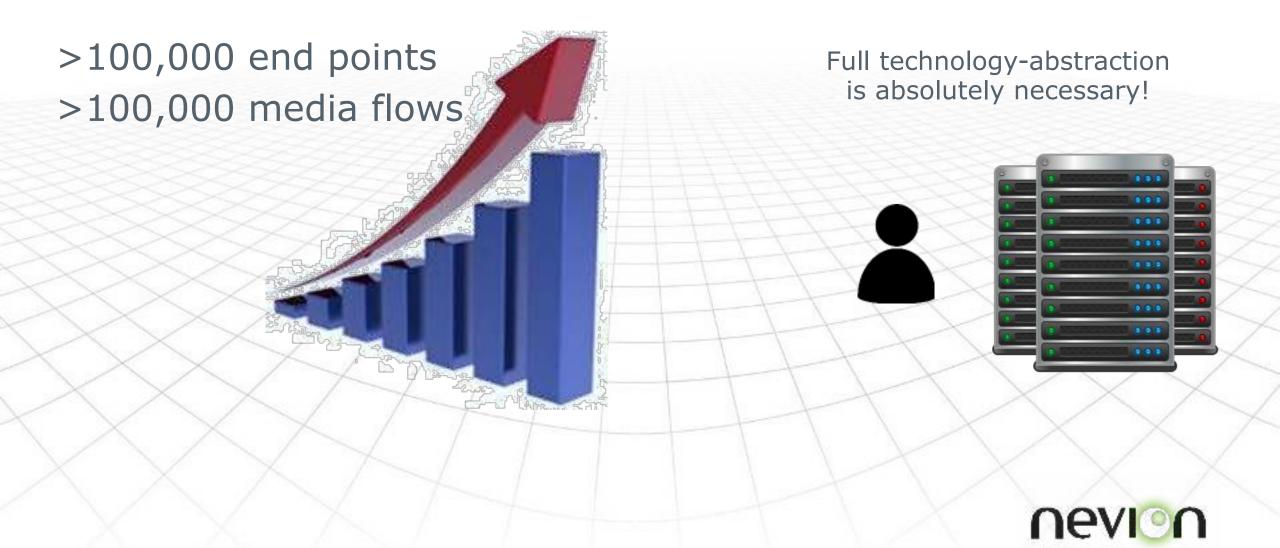
IS-05
Connectio
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Manageme
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IS-08
Audio
Channel
Mapping

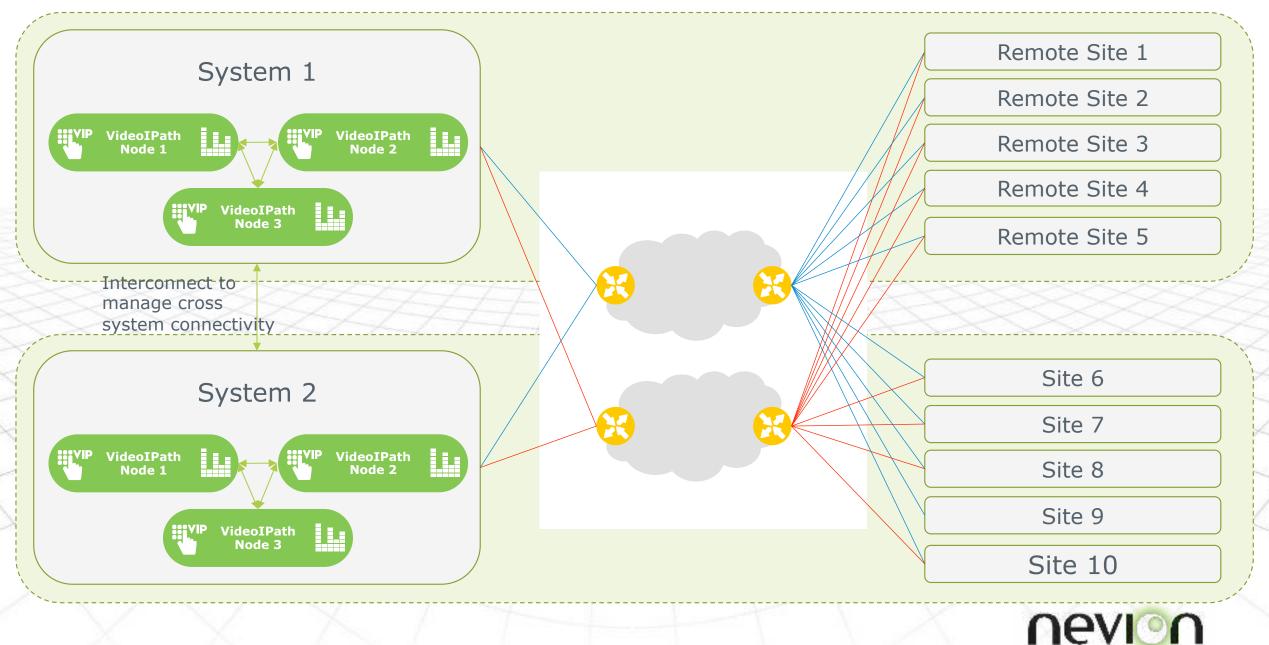
**IS-07** Event and Tally IS-0 9 System



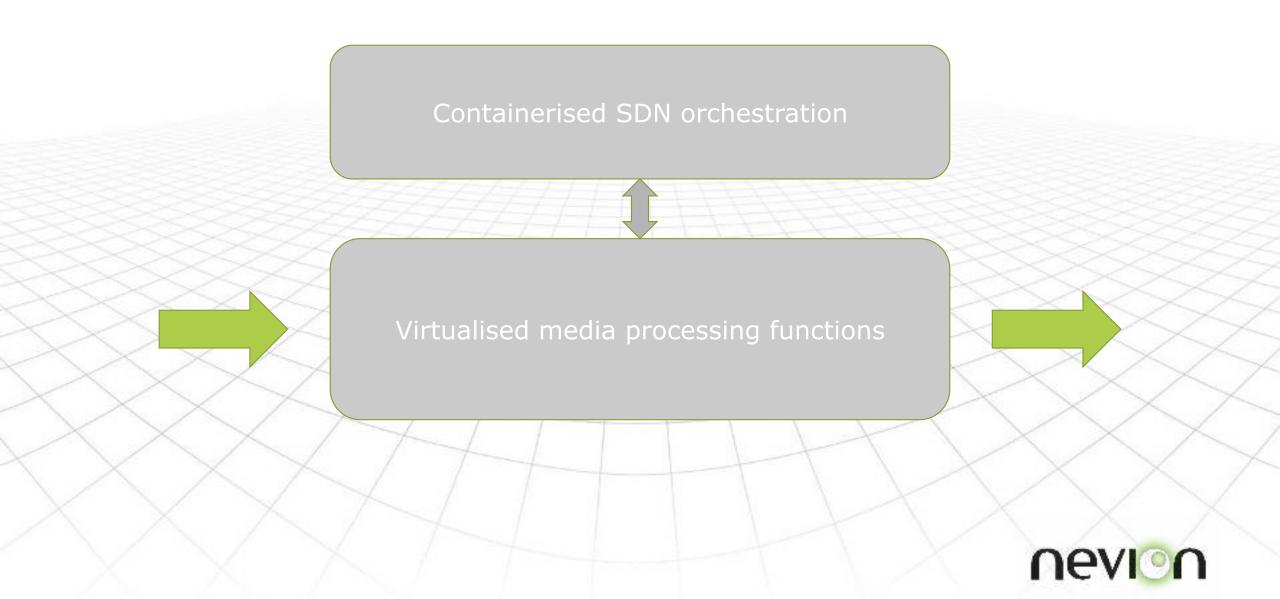
## Ever-increasing scale in recent deployments



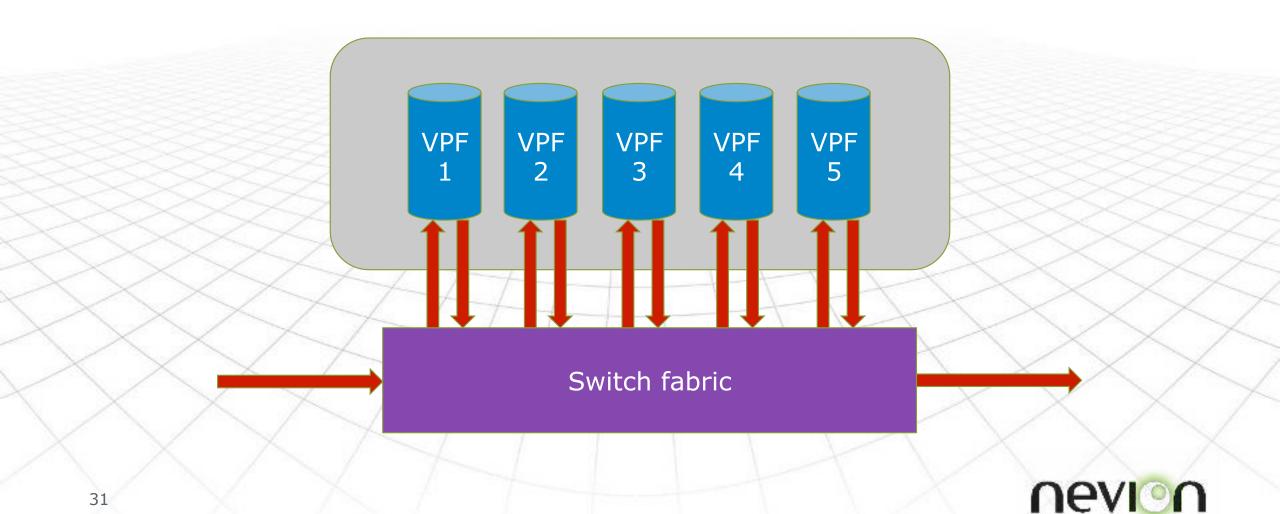
### Distributed architectures



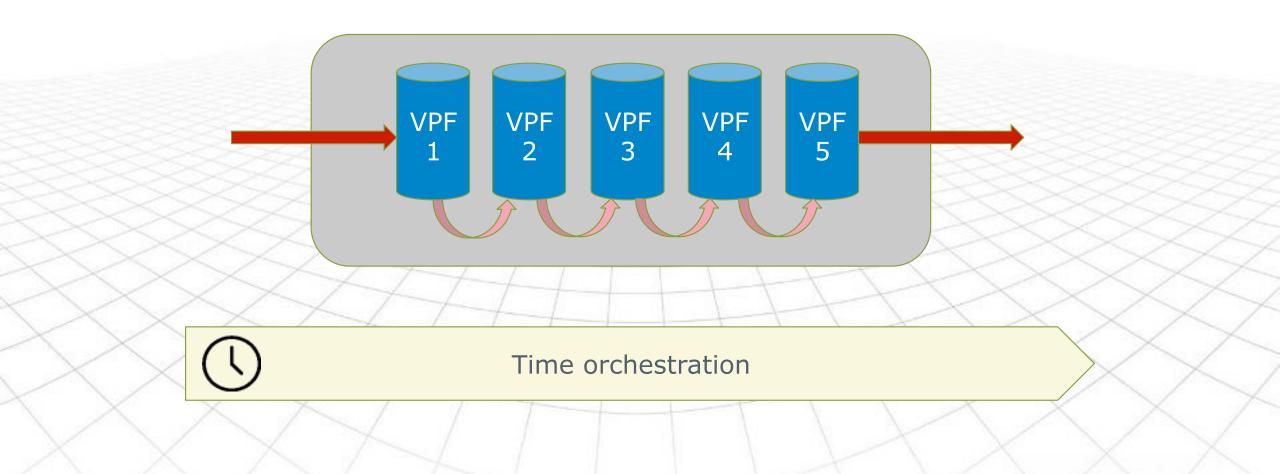
## Control and data plane becomes virtualised



## Separate virtual processing functions connected in 'real time IP' (e.g. ST2110) via external fabric



## Time orchestration





# nevion

ARCHITECTS OF VIRTUALIZED MEDIA PRODUCTION



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