

HPA Tech Retreat
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Future Media Infrastructure: Software Defined Hardware

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- Moderator
 - Eric Pohl
- Panelists
 - Mo Goyal, Evertz
 - Erling Hedkvist, Lawo
 - Andrew Osmond, Aperi
 - Alex Redfern, EVS

Panelist

- Mo Goyal
 - Director Product Marketing
 - Evertz Microsystems



- Mo has been with Evertz since 2005, with roles that include Product Manager for Modular Products and Master Control and Branding.
- He is currently responsible for business development and strategic marketing of new technologies (including Software Defined Video Networking, IP, and file playout) for all business units.
- Mo is the co-chair of the ASPEN Community and an active participant in educating the industry during the transition from SDI to IP.
- Prior to Evertz, his previous work experience includes: developing software for small to mid-size IP data routers, creating IPv6 forwarding engine for 10GbE network processors for large core IP routers, and introducing Ethernet services on Nortel optical transport products.
- He graduated with a degree in Computer Engineering from McMaster University in Hamilton, Ontario, Canada and has been a member of Professional Engineers of Ontario since 1996.

Panelist

- Erling Hedkvist
 - Senior Vice President and Business Development Manager
 - Lawo



- Erling Hedkvist is Senior Vice President and Business Development Manager at Lawo.
- Hedkvist has been in the broadcast industry since 2000 and started out working in product management before making the move over to sales, business development and management.
- Mr Hedkvist has specialized in providing networking solutions for the broadcast and media & entertainment industry, initially for contribution applications but over the last few years with an increased focus on providing software defined network (SDN) solutions for broadcasters.
- As such he works with clients to design solutions for Remote Production, Master Control, Playout, PCR, OTT etc using IP in a distributed/virtualized environment.
- Mr Hedkvist has presented with several prominent industry forums such as VSF, WBU-ISOG, SSPI, WABE and others and holds a Master's degree in Computer Science and Engineering with a specialization in Computer Communication from Lulea University of Technology in Sweden.

Panelist

- Andrew Osmond
 - Vice President
Business Development
 - Aperi



- A founder of Video Products Group Inc. in 1996 , Osmond has worked in the Broadcast industry since 1991 and in data transport since 1987.
- Osmond managed product development teams in the broadcast market in the US and Europe with Video Products Group and Nevion until 2013 with many large platform deployments serving telecom broadcast networks.
- Osmond is also a founder of Aperi Corporation which started in 2013. He currently develops business strategy, markets and key customer relationships in a broadcast market environment that is ripe for disruption.
- Osmond is evangelizing new technologies and assisting clients with their technology vision around the world.

Panelist

- Alex Redfern
 - VP PreSales Americas
 - EVS Broadcast Equipment



- Alex has over ten years experience in designing and deploying large-scale EVS systems worldwide.
- This included project managing the 2012, 2014 and 2016 Olympic Games, the 2014 World Cup, and multiple other big-events.
- As well as Sports events, Alex has been responsible for the roll-out of multiple EVS newsroom and broadcast center systems.

Future Media Infrastructure: Software Defined Hardware

- Introduction
 - NFV – the concept of Network Function Virtualization
 - Platforms for “software defined hardware” products
- Panel Discussion
 - Implications on facility design and operation

NFV - Embracing IT Concepts

- Network Function Virtualization – definition
- White paper presented at “SDN and Openflow World Congress” in 2012
- “Abstracting what the product does (functions features) and implementing them in software”

Software defined capabilities

- Spectrum of product design approaches

CPU	GPU	FPGA
<ul style="list-style-type: none">> General purpose compute> Mass market> Significant investment in fabrication> Mass market to recover cost	<ul style="list-style-type: none">> Graphics processor> Significant market> Significant investment in fabrication> Mass market to recover cost	<ul style="list-style-type: none">> Programmable hardware> Fast time to market> Lower development costs> Design can be iterated

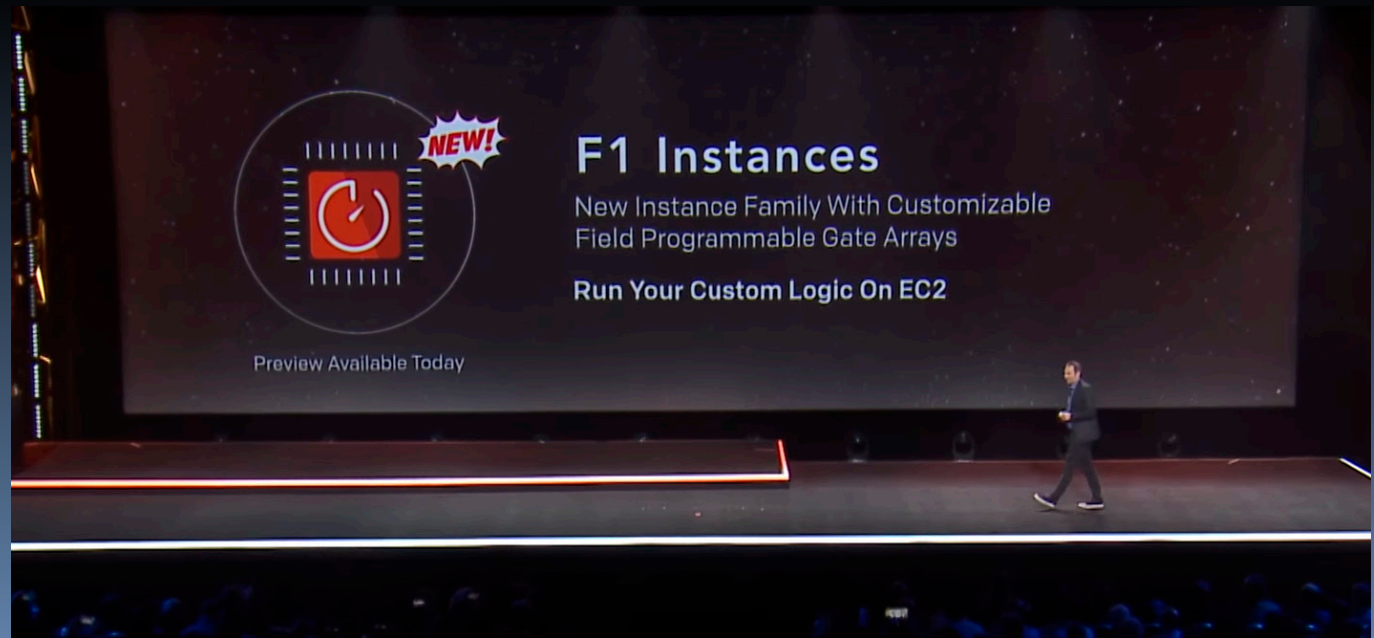
Intel/Altera CPU/FPGA chip

- Xeon E5 server processors
 - E5-2600 v4 "Broadwell"
- With Arria10 FPGA processor
- Starting shipping 4/2016



AWS F1 Instance type

- AWS re:Invent 2017





evEDGE

evEDGE FPGA Accelerated Compute Blades

High Capacity



Multiple Processing Cores. Each processing core provides the capacity of two 7814UDXs

Flexible Interfaces



Each Processing Cores supports bi-directional 3G/HD/SD-SDI and 10GbE

Low Latency



FPGA based compute enables microservices to be perform at ultra low latency for real time applications

High Density



Up to seven (7) Compute Blades in a 6RU evEDGE frame

APERI Corporation – An Agile, Elastic Data Center Implementation

1RU 10GbE/40GbE Ethernet Switch and Compute Platform

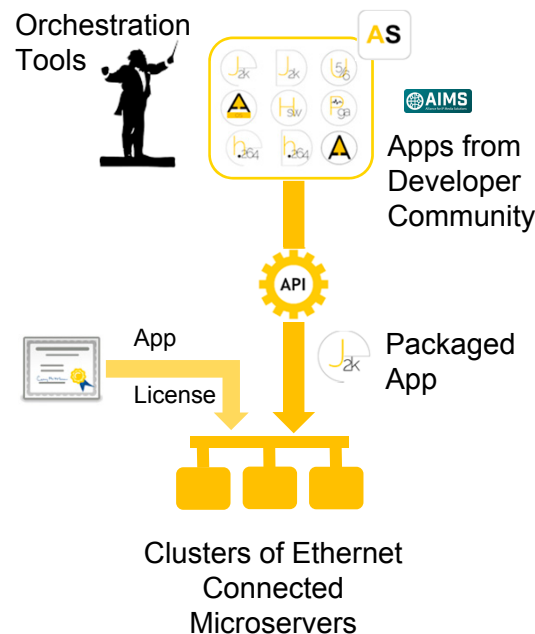


Reconfigurable FPGA Accelerated Microserver



Single Unit of Deployment

Media Function Virtualization



Functionality

Hardware

- Native IP, 10/40GbE Switch Platform
- L2/L3 and SDN capable
- FPGA accelerated compute elements
- Open for 'app development community'
- 2 Stock Keeping Units only
- Hardware enforced multi-tenant security

Software Ecosystem

- App Store for packaged apps
- Orchestration tools for app management
- API to deploy and run apps

Apps

- Standards based
- Not limited to video applications
- Limited by FPGA capacity and IO only
- Contribution and live production

Licenses

- Run license manager software
- Flexible app licensing scheme
- Optimizes use of compute resources

LAWO V__matrix



V__matrix is not a router, it's a high capacity processing platform

All functions run on re-configurable FPGA software modules

Different processing functions and workflows on-demand,
can be changed during runtime (VSM)

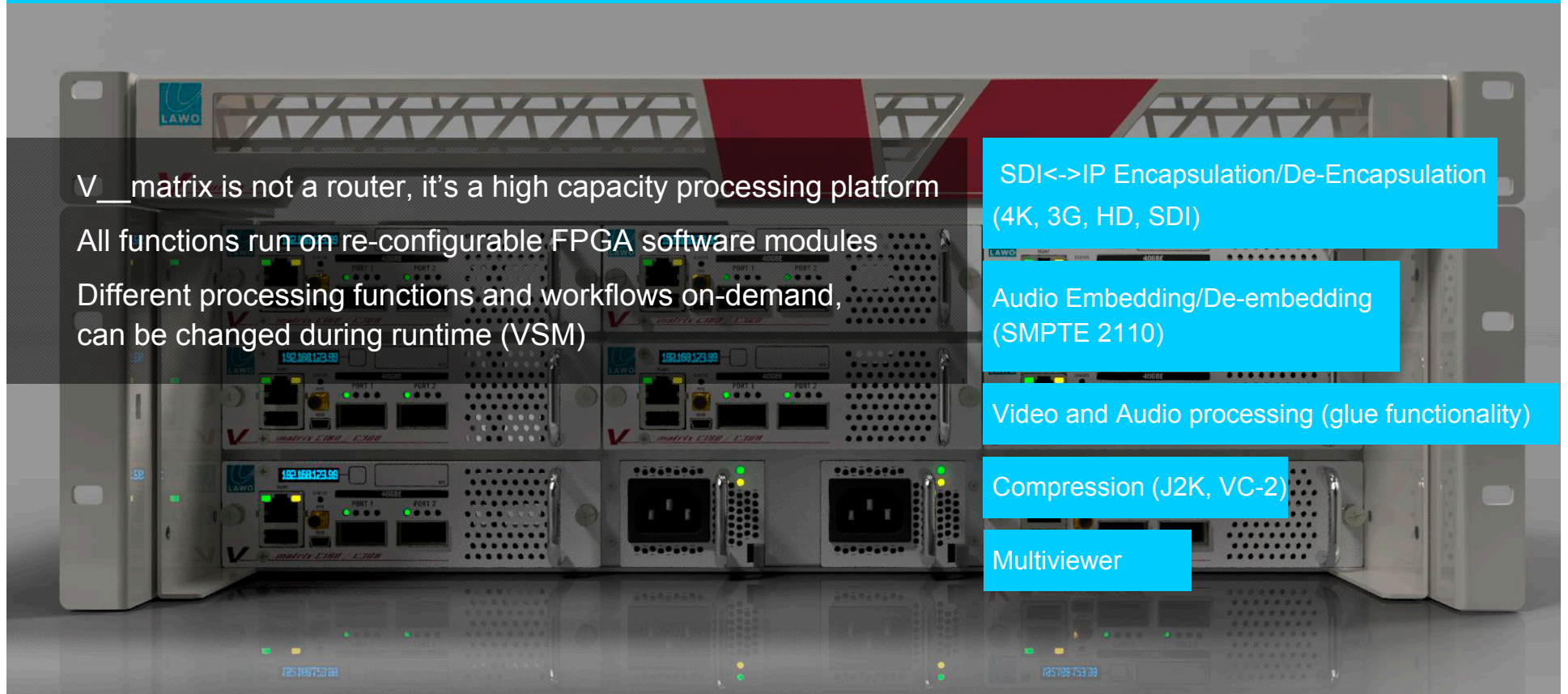
SDI<->IP Encapsulation/De-Encapsulation
(4K, 3G, HD, SDI)

Audio Embedding/De-embedding
(SMPTE 2110)

Video and Audio processing (glue functionality)

Compression (J2K, VC-2)

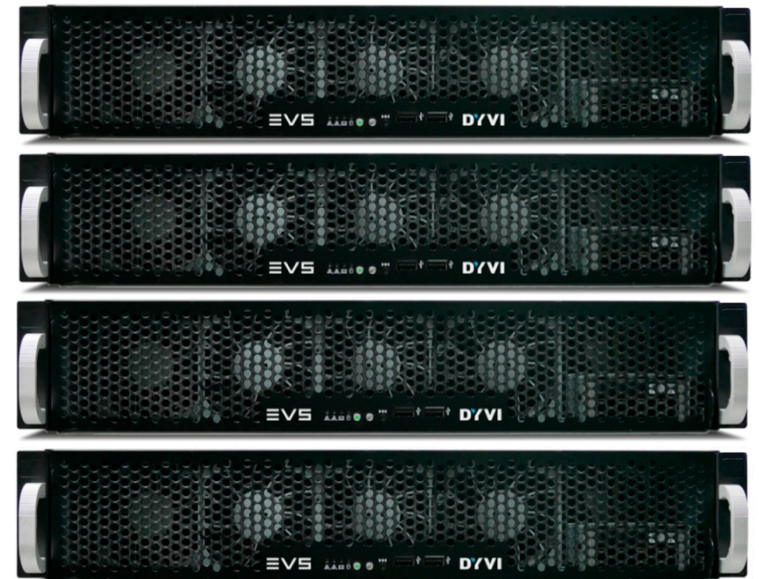
Multiviewer





NEW SWITCHER DESIGNS USE IP

- Scale through Processing modules
- Distribute using an IP fabric
- Inputs and outputs are shared resources
- Processing Power increases with the stack
- GPU enabled creative layering



Discussion

- As we move from single purpose products to agile definable products as facility *engineers* and *operators* what benefits and what challenges should we be expecting?
- Taking these trends into consideration ... what do we expect the infrastructure landscape will be *5 years from now?*
- What are the *commercial implications* of separating the functions from the hardware?
- How did we get here? What were the *enabling technologies* and standards?

ETSI White papers on NFV

- https://portal.etsi.org/nfv/nfv_white_paper.pdf
- https://portal.etsi.org/nfv/nfv_white_paper2.pdf
- https://portal.etsi.org/Portals/0/TBpages/NFV/Documents/NFV_White_Paper3.pdf