Using Microservices for the most agile, cost-effective Live Productions

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The 3 key technology decisions that matter

**IP Standard**

- RTP Flow
- ST 2022-6 (Video, Audio, Anc + blanking)
- ST 2110-20 (Video)
- ST 2110-30 (Audio)
- ST 2110-40 (Anc)
- ST 2110-10 (Timing)

**Virtualization**

- Service, Function, HW abstraction
- Virtual Machines
- Service Oriented Architecture (SOA)

**Benefits:**

- Generic HW (high volume, reliable, economical)
- Location independence (start/stop operational agility)
- Metered, floating licenses, pay-as-you-use (Opex vs Capex)
- SW innovation speed (community)
- Elegant and fully protected architectures

Virtualization brings the biggest benefits (by far)

**API’s**

- NMOS APIs (IS-04, IS-05, IS-06)
- Applications
- Platform
- Infrastructure
- HTTP REST

**Technology Progression**

- Media Function Virtualization
- API adoption (AMWA NMOS, others)
- Media over IP (AIMS roadmap)
- Baseband
Media Function Virtualization (MFV) – what is it?

API

Hypervisor

Library of functions

1

Low-Latency broadcast media

2

IP Switch / Network

3

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“Start Color-Correction” or “Stop Multiviewer”

Library of Broadcast, low-latency Functions (micro-services)
Utility Pricing/ License Models

- Metered costing – Pay-as-you-Use
- Multi-Tenancy

Orchestration 1 \hspace{1cm} Orchestration 2
\hspace{1cm} Virtualization Stack – Containers (e.g. Docker)

On-Premise IP Switch / Network \hspace{1cm} Public Cloud

Low latency, broadcast media

Timing and QoS – critical design choices

- Interconnection technologies must be carefully considered. 2110 or 2022?
- Choice of networking equipment is very important. Support of Media technology feature sets is mandatory (e.g. 1588 PTPv2)
- Consider that each network domain will most likely have their own timing hierarchy
- FPGA technology provides the basis for the lowest jitter, lowest latency and highest throughput
From IP Showcase Theatre at IBC 2018

Live IP Remote Sports Production

Curated by the Video Services Forum vsf.tv
Transition to Virtualization – that’s what really matters

- SMPTE 2022, and especially SMPTE 2110, AMWA NMOS standards are the perfect stepping stones

- Low-latency (msec’s), Live (remote) production and distribution:
  - Virtualized FPGA compute infrastructure
  - Direct attached, wire speed ethernet to the FPGA
  - IP timing and QoS are important design choices

- Agility:
  - A complete library of Broadcast function Apps
  - Floating and metered licenses

- In use:
  - Live IP and Virtualized Premium Sports Remote production network

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Microservices-based and native-IP
(Remote) Live Production

● Ultimate architecture● Here today!!!

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