The transition to microservices based media processing architecture

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Mediakind

Monday, September 16 from 2:30 – 3:00pm

Who We Are

- Global leader - media processing, delivery, and TV service platforms for Broadcasters and Cable, Satellite, Telco, and OTT TV operators
- Technology investor - Approximately 1,000 HC in R&D
- Innovation driver – Media is our passion, Consumer experience drives us

Key R+D Locations

Global footprint, diverse customer base

What We Offer

<table>
<thead>
<tr>
<th>Media Platforms</th>
<th>Media Processing</th>
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<tbody>
<tr>
<td>MediaFirst</td>
<td>H/W Compression</td>
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<tr>
<td>Mediaroom</td>
<td>S/W Compression</td>
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<table>
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<tr>
<th>Media Delivery</th>
<th>Additional value</th>
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<tbody>
<tr>
<td>Cloud DVR &amp; Timeshift TV</td>
<td>Content Mgmt. Sys. (CMS)</td>
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<tr>
<td>Optimized AV</td>
<td>Advertising &amp; Content Rights Distribution</td>
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<td>Support and Services</td>
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</tbody>
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Segments We Serve

- Media Platforms
  - 75+ Telco & Cable Operators with 19M subscribers
- Media Processing
  - 2,000+ Broadcasters, Pay TV & OTT operators
- Media Delivery
  - 60+ Cable & Telco Pay TV operators
- Product Delivery & Support Services

Welcome to MediaKind...

Curated by Video Services Forum vsf.tv
Agenda

• Why are we here today?
• When Video Services become Micro...

Why are we here today?
Where the Media industry is coming from...

**Performance vs Flexibility**

**Performance**

Processing Performance was judged by individual codec bandwidth savings:
- More channels on same network (e.g. satellite...)
- Better quality of services

Flexibility was a trade-off against performance

Media Landscape is changing...

Broadcast Challenges

• Industry-specific interfaces
  – Impedes ability to scale and grow operation efficiently
  – Maintaining broadcast specificities: latency, reliability and uptime

• Separate Broadcast & IT infrastructures
  – Increases opex and inhibits flexibility
  – Removing technical and cost barriers for scaling and evolving

• New entrants able to offer compelling services, faster to market
  – How to leverage virtualization and other agile processes?
  – Enabling larger variety of commercial models

The answer: Media moving IP Cloud Native

- Infrastructure
- Operations
- Finance
The Value of Cloud Solutions

- Leverage Network and Infrastructure
- Streamline Services & enable Cloud Operations
- Develop Business
- Full Automation
- Fast Time to Market
- Best Customer Experience
- Embrace Innovation

Up to 40% capex and opex saving opportunities
Revenue growth opportunities

What is so specific for Media?

- Transactional
  - All TV and mobile User Interfaces available in the public cloud
  - Content and Subscriber management
  - Personalized experience

- Flow-oriented
  - 12GBps / live stream with few ms latency
  - “five nines”: 5.26min downtime per year!
  - Peak traffic: 72 Tbps (~10 million DVDs per hour) – Akamai 2018

- Storage-based
  - 100s of PBs of storage for TV show private copy
  - Stored “in the Cloud” & accessible from anywhere at anytime

All these workloads have to work together!
When Video Services become Micro...

Cloud – a fog of terminology

- Orchestration
- Virtual Machines
- Containers
- Virtual Private Cloud
- Kubernetes
- Elastic Compute
- Hypervisors
- Openstack
- AWS
- Azure
- IaaS
- SDN
- Hypervisor
- PaaS
- Serverless
- Unikernel
- Cluster
- Microservices
- Public Cloud
- Hybrid Cloud
- Private Cloud
- Docker
- GCP
- NFV
Appliance vs VM vs Orchestrated Containers

**Appliance**
- Application: Appliance
- OS, Base image: COTS
- Hardware: COTS

**Virtualized**
- Application: Virtualized
- OS, Base image: COTS
- Virtualization Hypervisor
- Hardware: COTS

**Orchestrated (Pods of) Containers**
- Application Registry
- Orchestration
- Hardware: COTS

### Appliance
- Simple!
- Fixed & silo
- Difficult to scale
- HW + SW link

### Virtualized
- Decouple HW & SW
- Scripted deployment
- Easy to replicate
- Challenge to scale
- Loss of performance
- Inefficient deployment

### Orchestrated (Pods of) Containers
- Built to scale
- Complete flexibility
- Zero loss of performance
- Infrastructure agnostic
- Virtualization optional
- New & unfamiliar

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**Source:** https://cloud.google.com/kubernetes-engine/kubernetes-comic/
Microservice applications = Separated SW components as deployable units

Contrast microservices with monolithic applications

- Design philosophy: Break application into a series of smaller, separately deployable units

Offer natively, enables flexibility, fast technology deployment & up-to-date media operations...

- More options for solution scalability
- More options for service implementation
- More options for containing failures and improving operational resilience
- More options for incremental development and deployment

> “Micro” means as small as it should be but no smaller

Source: Forrester

Container = Self-contained Microservices SW packaging isolated from host

- Container is an operating-system-level virtualization method for running multiple isolated systems / applications (containers) on a single control host

  - Characteristic
    - Light weight (vs Hypervisor overhead)
    - Shared Kernel and libraries
    - Isolation
    - Self contained

  - Challenges
    - How to run and manage it at scale
    - Security level for isolation
Kubernetes = deploy – scale – failover of containers
Dynamic Orchestration of containers on infrastructure resources

The name is from Greek for “Helmsman” or “Pilot”; Nickname “K8s”
Kubernetes is an open-source system for automating deployment, scaling, and management of containerized applications
It dynamically manages resources availability, container allocation and scheduling ensuring reliability.

- Schedules, runs, and manages containers on virtual and physical machines
- Supports “Planet Scale” without increasing your ops team
- Supports more container runtimes than just Docker
- 100% Open source, written in Go language
- Inspired and informed by Google’s experiences and internal large scale cluster system (Borg)

```
apiVersion: extensions/v1beta1
kind: Deployment
metadata:
  name: deployment-myname
spec:
  replicas: 2
  template:
    metadata:
      labels:
        app: app2
        location: sou
    annotations:
      prometheus.io/scrape: "true"
      prometheus.io/port: "9102"
    spec:
      nodeSelector:
        location: sou
      containers:
        - name: some-name
          image: busybox:1.28.1
          command: ["sh", "-c", "/bin/sh -c /var/tmp/dcc/encoder -i /var/tmp/dcc/config.yaml -a encoder"]
          ports:
            - containerPort: 80
          volumeMounts:
            - name: config-volume
              mountPath: /var/tmp/dcc
              resources:
                requests:
                  cpu: "500m"
              volume:
                name: config-volume
                configMap:
                  name: config-RELEASE-NAME=sou=0
```

Everything as code
Containers shipping, not a 1-container ship

- Built the right way
  - Application executable and files
  - Requires OS libraries
  - Nothing else
  - Minimal storage
  - Fast deployment

- Built the wrong way
  - Application executable and files
  - All OS libraries
  - Bloat makes it large and slow to deploy

Cloud Native Architecture

- Analytics and Monitoring
- Application Management
- Kubernetes Services
- Pods of Containers
- Media µService
- Media µService
- Container Runtime
- Bare metal
- Openstack
- Google Cloud Platform
- Microsoft Azure
- Amazon Web Services

- Kubernetes Services
- Pods of Containers
- Media µService
- Media µService
- Container Runtime

Open, Standard Tools Wherever Possible
Example of resilient Live OTT on Kubernetes

Cloud is one key concept but multiple ways to enable it

IT flexibility is required but with Media & Broadcast attributes

Operational excellence blended with Best quality & Innovation is the new standard

Select carefully PARTNERS in this journey!

Transformation journey is not only on vendors or technologies but also on Operators mindset and organization
Thank you

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Thank you to our Media Partners

[Logos of SVG, SVG Europe, and TVB Europe]

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