Sit back and relax

Mediakind? We do TV!

Cloud Native... Media ?!!

Cloud Native... Challenges

Wants to see 360° in the Cloud?

Who are we?

▶ **Arnaud Caron**

- ▶ Joined Techicolor in 2003
  - ▶ Software Engineer, Software architect, Innovation
  - ▶ IPTV, OTT…

- ▶ Joined NSN / Accenture in 2010
  - ▶ Via acquisition
  - ▶ Solution Architect
  - ▶ Large customer solution for Broadcast, IPTV, OTT

- ▶ And Mediakind!
  - ▶ Joined Envivio in 2013 acquired by Ericsson and divested to Mediakind

- ▶ **Now: Head of Management, Orchestration & Cloud (Product Management)**

▶ **Jerome Champetier**

- ▶ Joined TANDBERG Television in 2004
  - ▶ Software Engineer
  - ▶ Working on the first IPTV systems in the world

- ▶ Joined Ericsson in 2007
  - ▶ Via acquisition
  - ▶ Ported Linux 2.6.23 on custom appliances
  - ▶ Then wrote Linux drivers & apps for these appliances

- ▶ Joined MediaKind in 2019
  - ▶ Via divestment

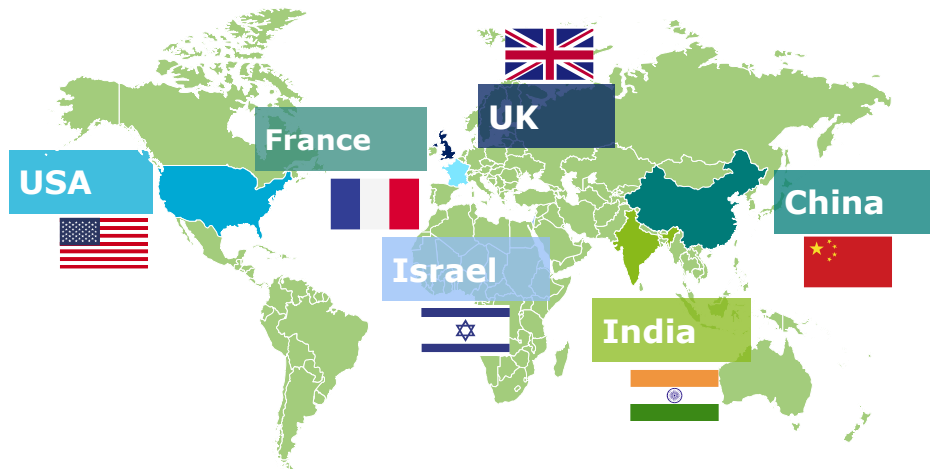- ▶ **Now: Senior Technology Architect at MediaKind**

MediaKind Overview

MediaKind
everyone. everywhere.

A Global Leader in Media Technology

▸ Providing media processing, delivery, and TV service platforms for Broadcasters and Cable, Satellite, Telco, and OTT TV operators
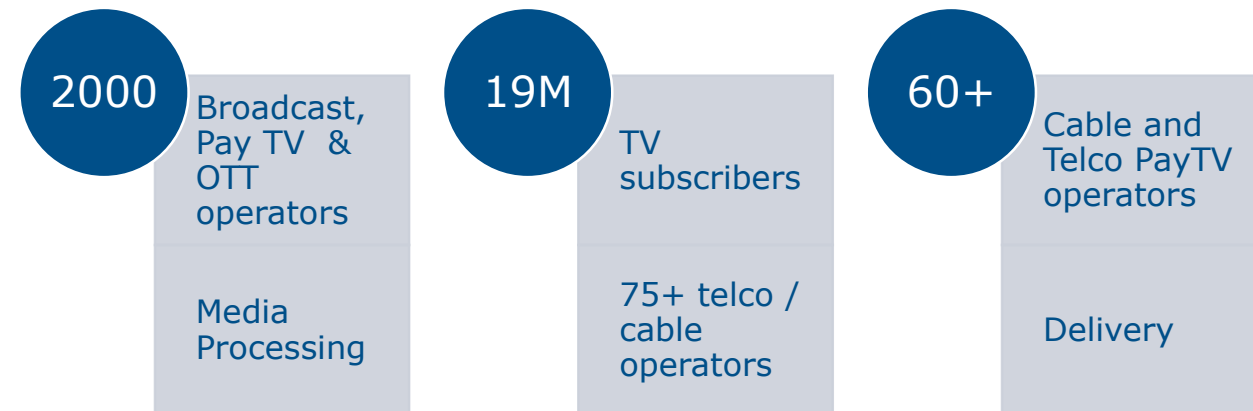
Key R+D Locations

Approximately 1,000 HC in R&D

USA
France
UK
Israel
India
China

Global customers

Global footprint, with diverse customer base

2000 — Broadcast, Pay TV & OTT operators

Media Processing

19M — TV subscribers

75+ telco / cable operators

60+ — Cable and Telco PayTV operators

Delivery

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What we do? Media & Entertainment ☺

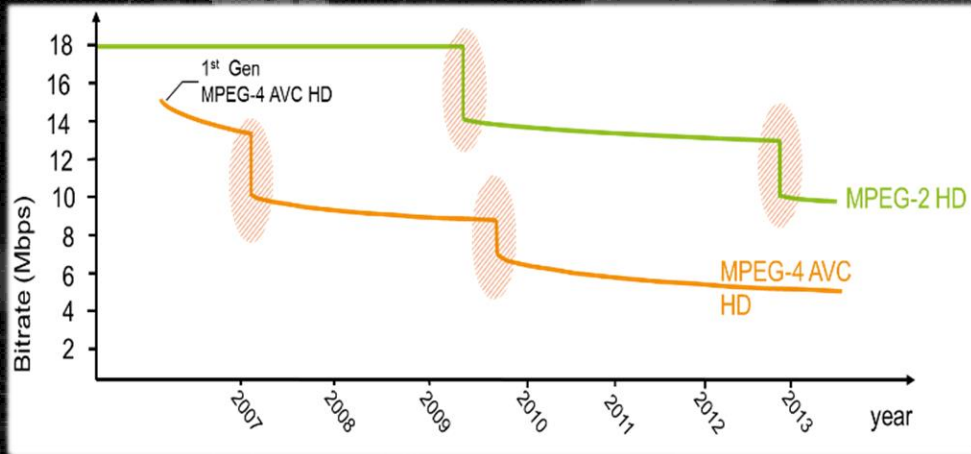▶ **Processing, Delivery and Platforms Technology & Services for enabling high quality media!**
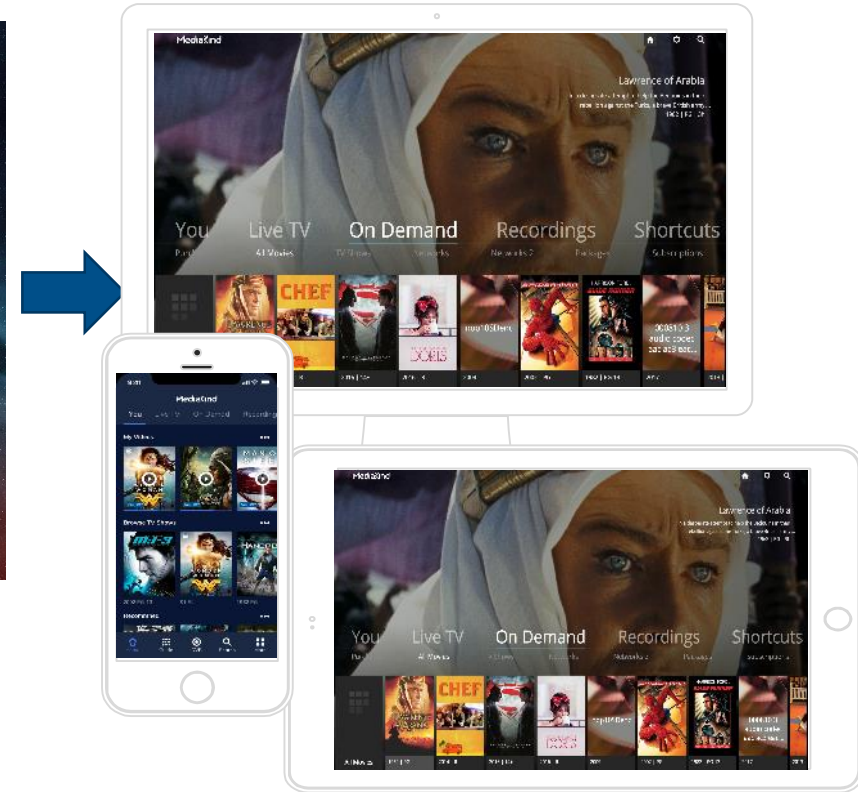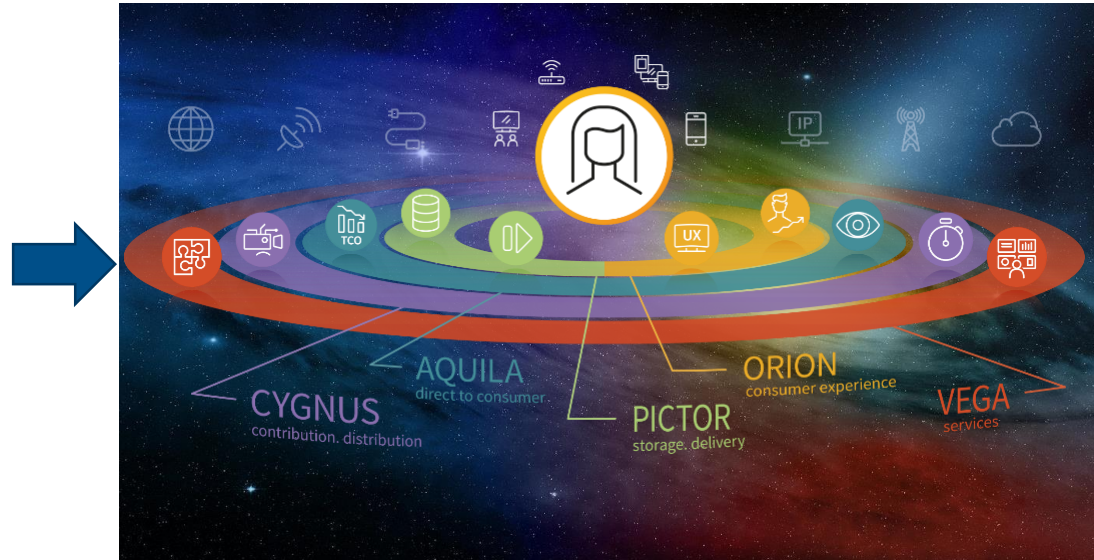
- ▶ Live TV / Streaming solutions
- ▶ Replay TV & Network DVR solutions
- ▶ Video On Demand solutions
- ▶ Advertising & advanced experience solutions...

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Where the Media industry is coming from...

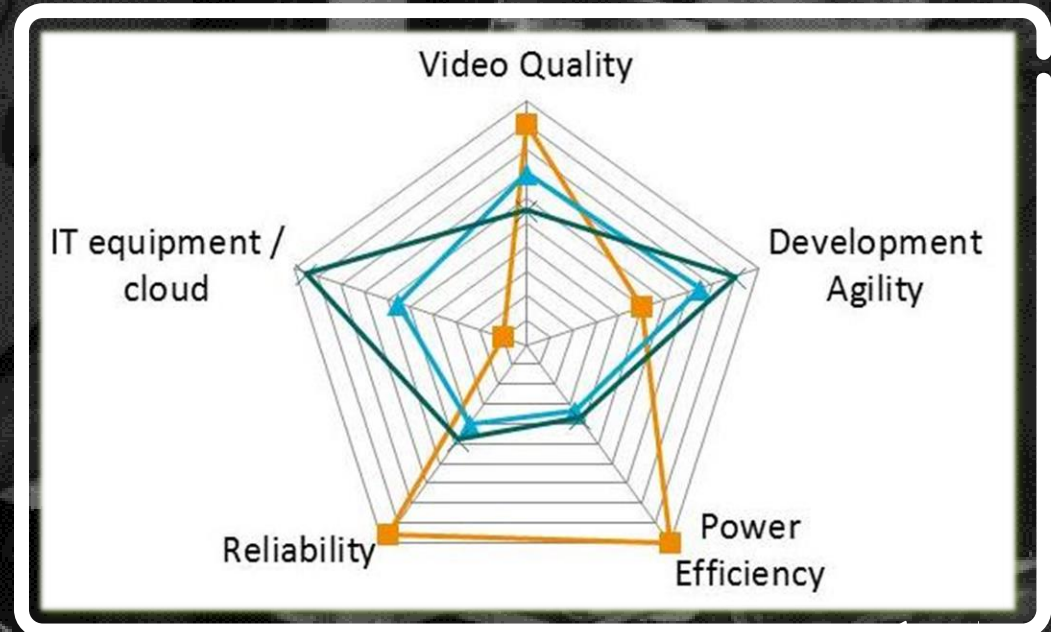Performance vs Flexibility

Performance

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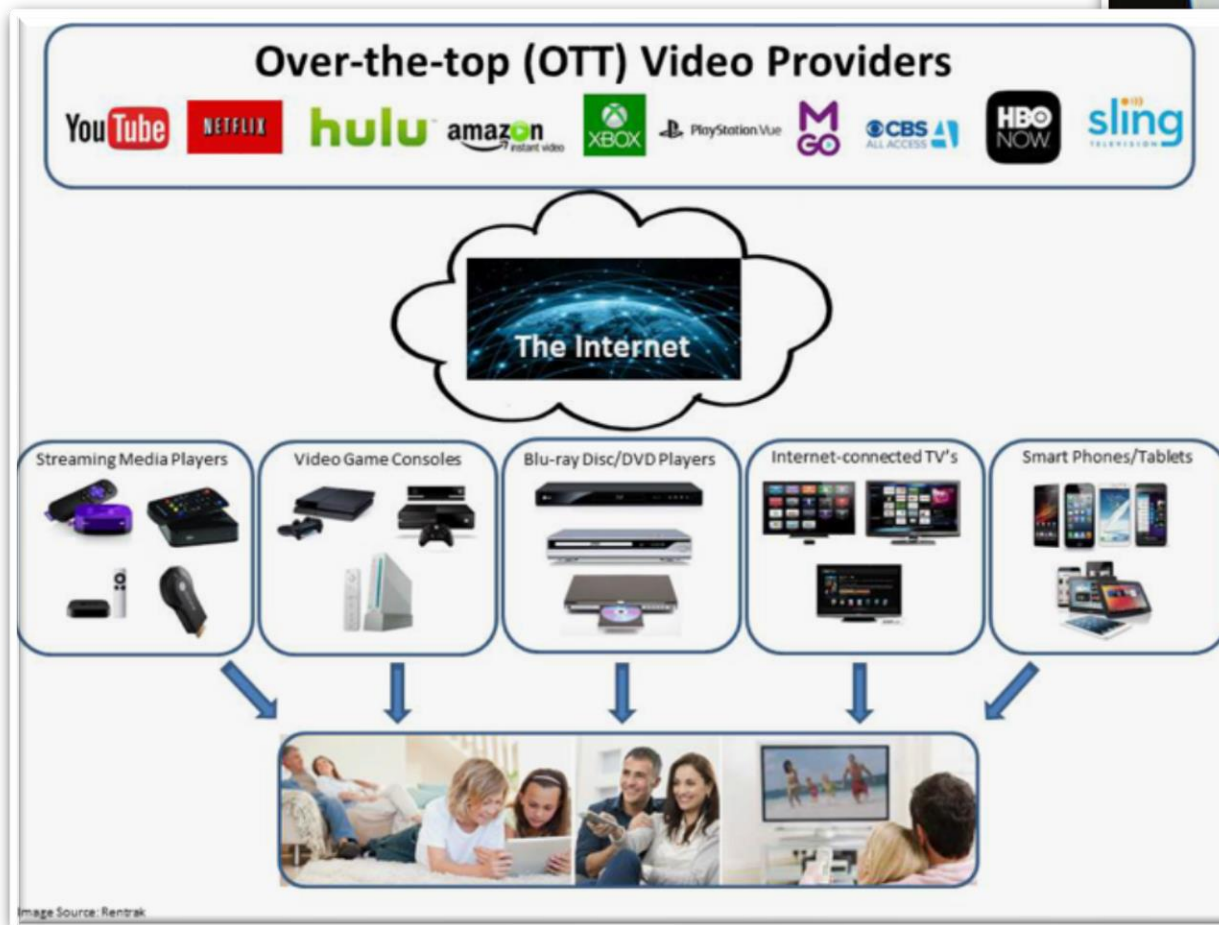- More channels on same network (e.g. satellite...)
- Better quality of services

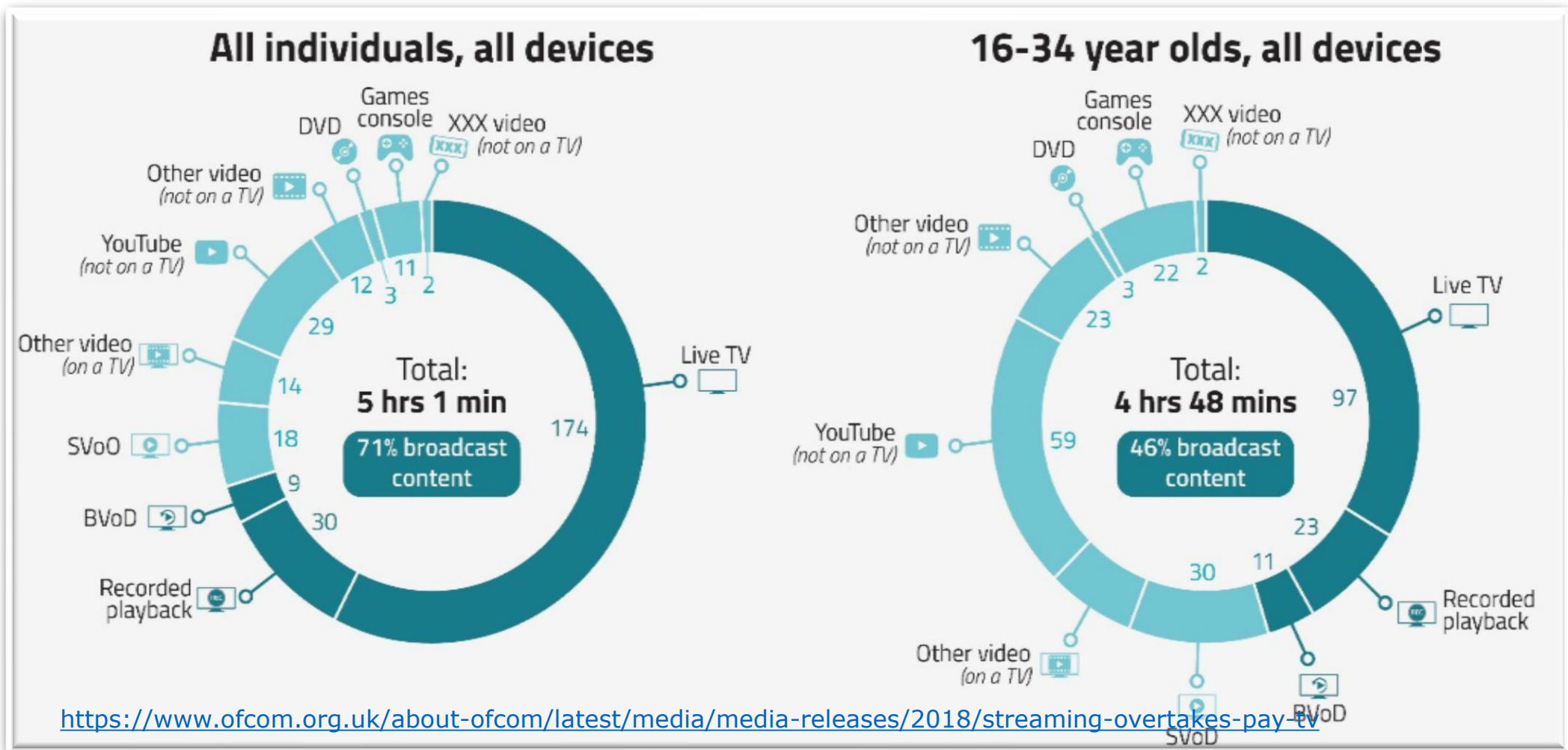Flexibility was a trade-off against performance

Network & PayTV operators are under pressure

- OTT (Over-The-Top) remove the physical link (cable, DSL…) between Pay TV / network operators & access to TV services!

https://blog.technavio.com/blog/top-13-companies-in-the-over-the-top-ott-market

https://www.nabshow.com/thought-gallery-Tech-Talk/quality-control-monitoring-ott-workflow

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Network & PayTV operators are under pressure

▸ New ways of doing & consuming TV: THERE and NOW with awesome personal EXPERIENCE!

All individuals, all devices

Other video (not on a TV)
YouTube (not on a TV)
Other video (on a TV)
SVoO
BVoD
Recorded playback
DVD
Games console
XXX video (not on a TV)
Live TV

12 · 3 · 11 · 2
29
14
18
9
30
174

Total: 5 hrs 1 min
71% broadcast content

16-34 year olds, all devices

Other video (not on a TV)
YouTube (not on a TV)
DVD
Games console
XXX video (not on a TV)
Live TV
Recorded playback
BVoD
SVoD
Other video (on a TV)

3 · 23 · 22 · 2
59
97
23
11
30

Total: 4 hrs 48 mins
46% broadcast content

https://www.ofcom.org.uk/about-ofcom/latest/media/media-releases/2018/streaming-overtakes-pay-tv

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The answer: Media moving Cloud Native?

Infrastructure

Operations

Finance

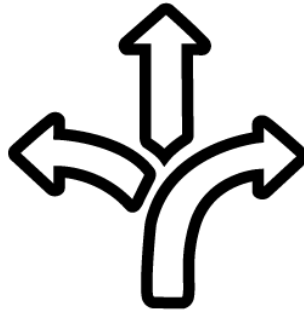# What is so specific for Media?

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**
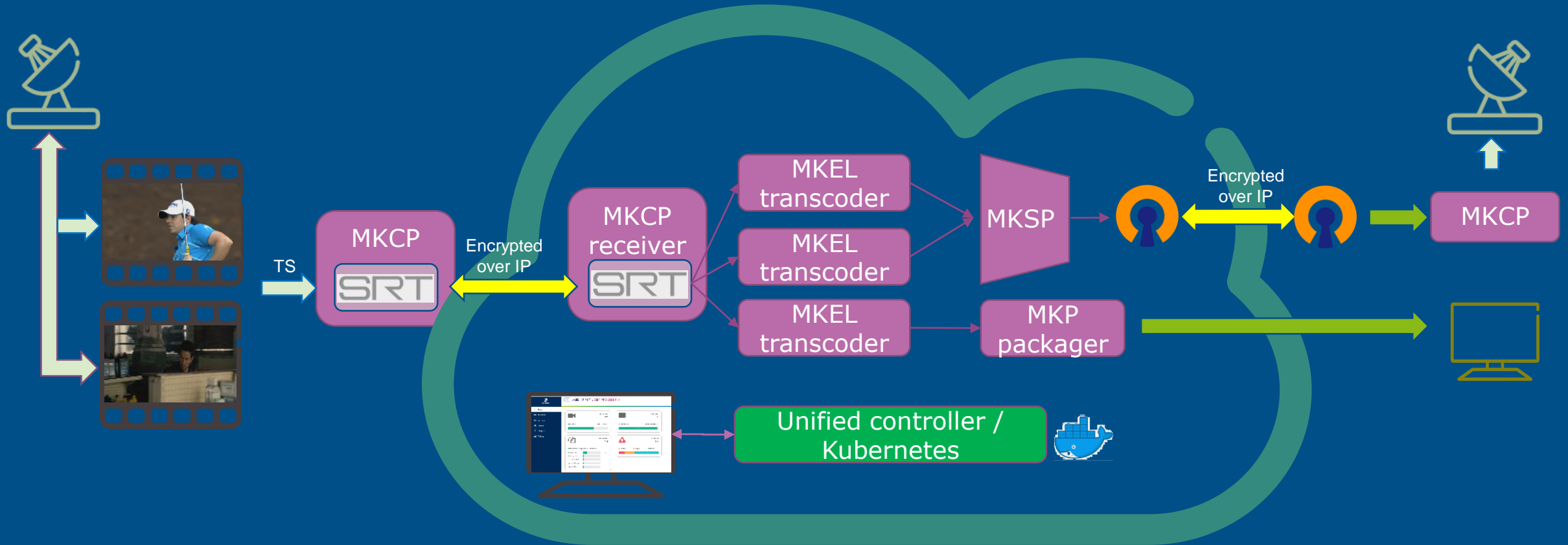- Stored **"in the Cloud"** & accessible from **anywhere** at **anytime**

All these workloads have to work together!
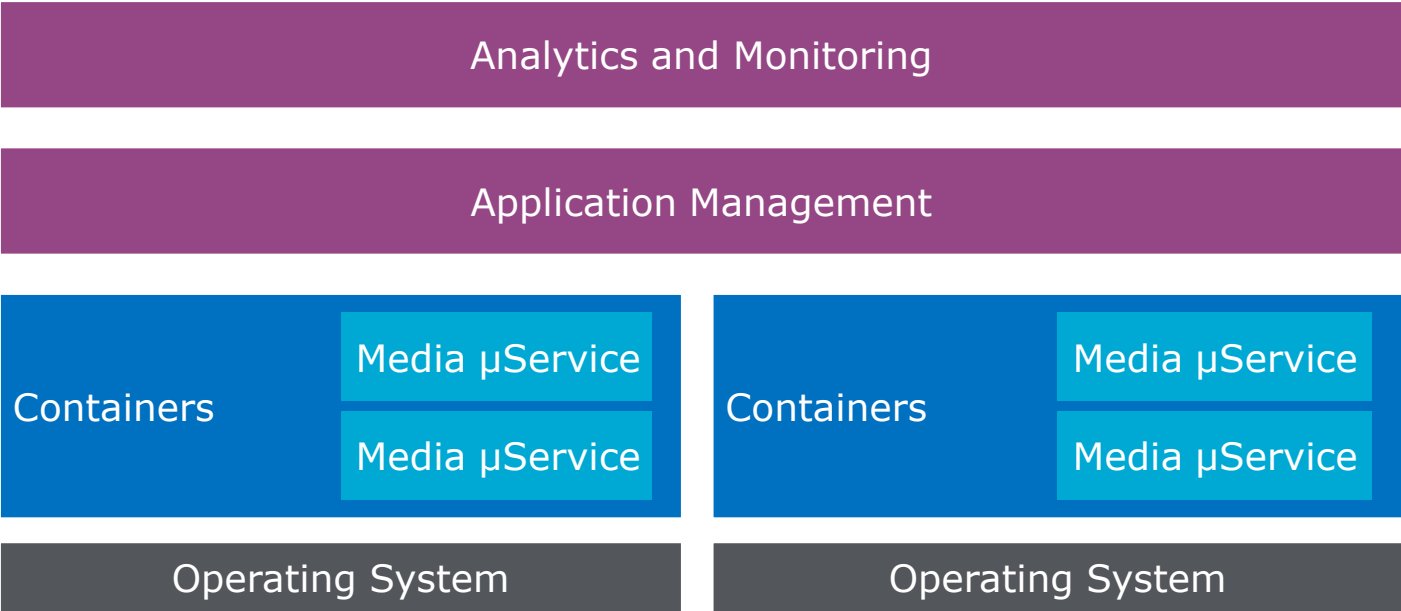
Live TV Evolution 2018 - 2020

Cloud Uplink

Public cloud

Cloud Downlink

TS

MKCP

SRT

Encrypted over IP

MKCP receiver

SRT

MKEL transcoder

MKEL transcoder

MKEL transcoder

MKSP

MKP packager

Encrypted over IP

MKCP

Unified controller / Kubernetes

Architecture Evolution

Analytics and Monitoring

Application Management

| Containers | Media µService |
| | Media µService |

Operating System

| Containers | Media µService |
| | Media µService |

Operating System

High-Level Management

Micro-services, Containers and Networking

Application Management & Monitoring

Infrastructure

Bare metal

openstack

Google Cloud Platform

Microsoft Azure

amazon web services

Seamless interface to private and public cloud

May 19

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What about infrastructure?

Dedicated Appliances

Connected via Ethernet

Integrated into servers

E.g: PCIe option card

Deployed into Clouds

E.g: AWS, Google Cloud

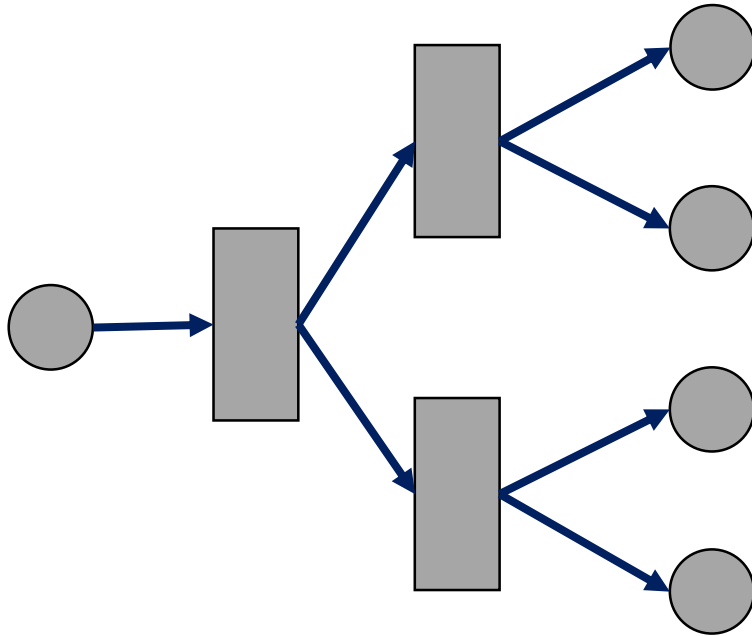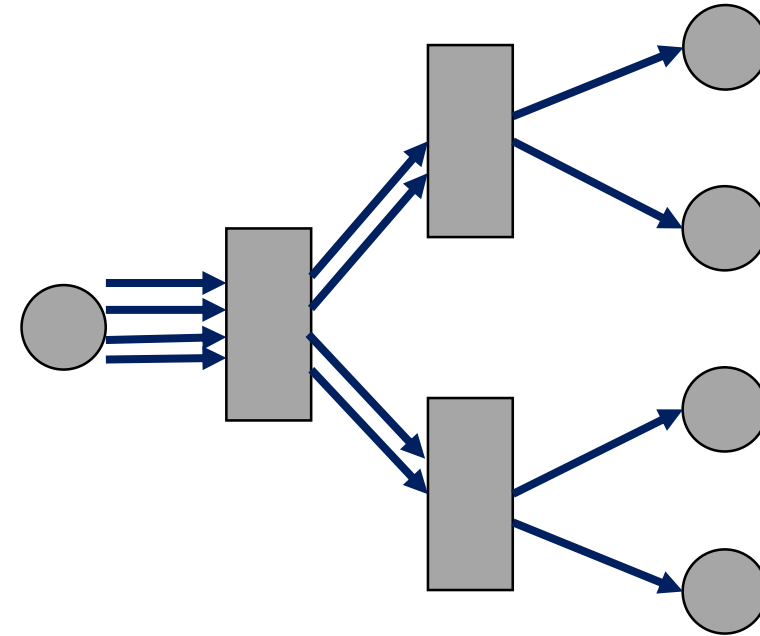# What about networking?

▸ **TV is migrating from ASI/SDI**

▸ **... To IP**

But progressively

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Live TV and Container Networking
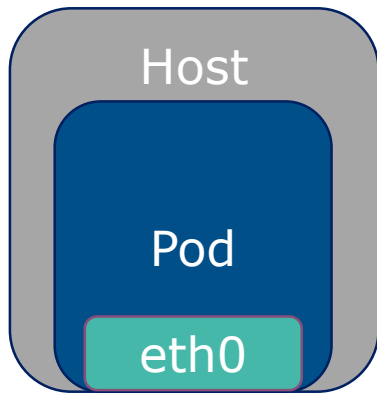
▸ **Live TV is often Multicast**

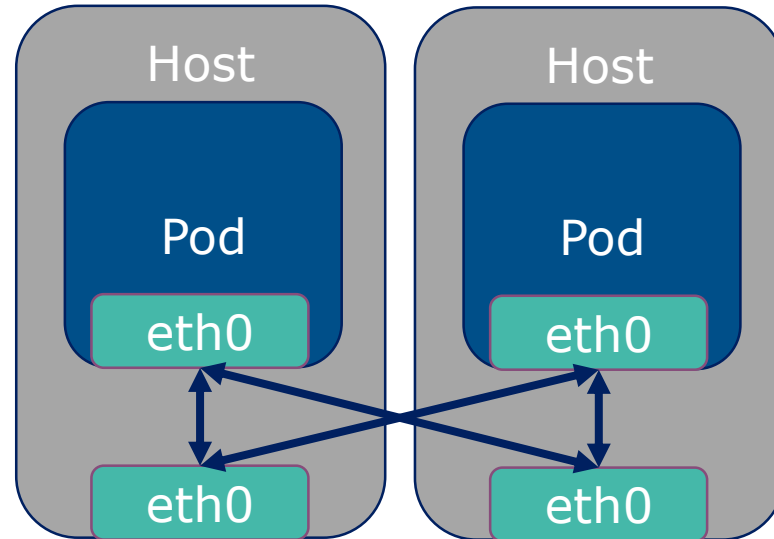▸ **Container Networks are Unicast**

So we have to convert flows!
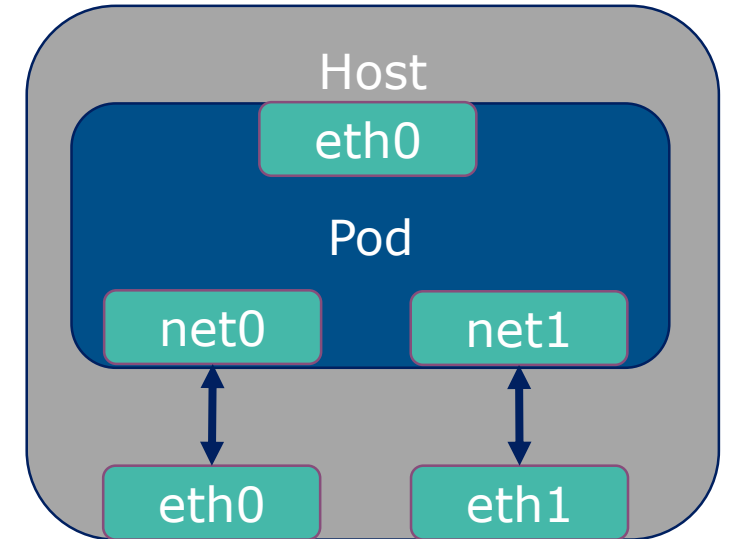
Container Networking: What a journey!

▶ **Host networking**   ▶ **NodePort Services**   ▶ **Multiple NICs**

Example of Live TV on Kubernetes

az_1

Controller

Encoding

Packaging

1+1 Sync

1+1 Sync

Input sources

Encoding

Controller

Packaging

az_2

Origin Server

Content Delivery Network

Controller pods
Encoding pods
Packaging pods

May 19

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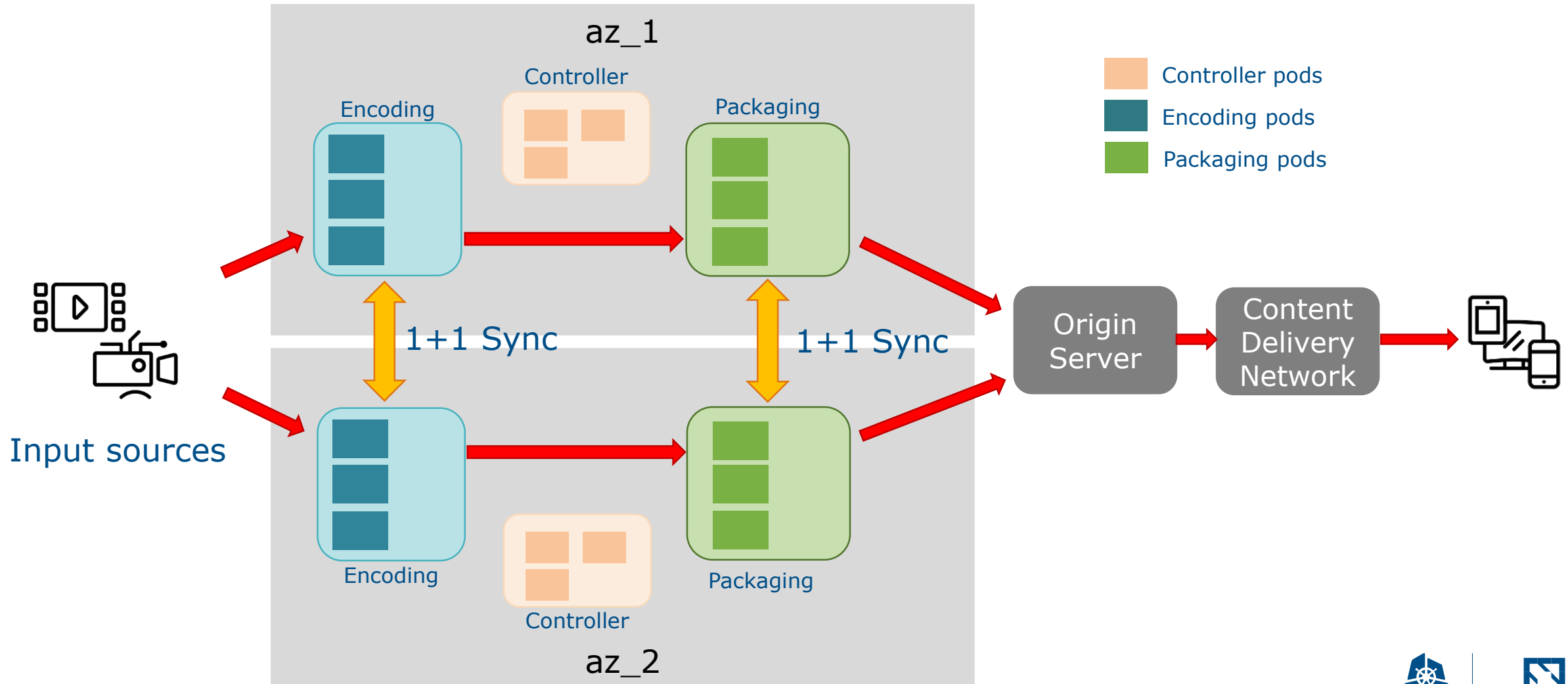
Application deployment

From Containers to Solutions

Collection of containerized micro-services
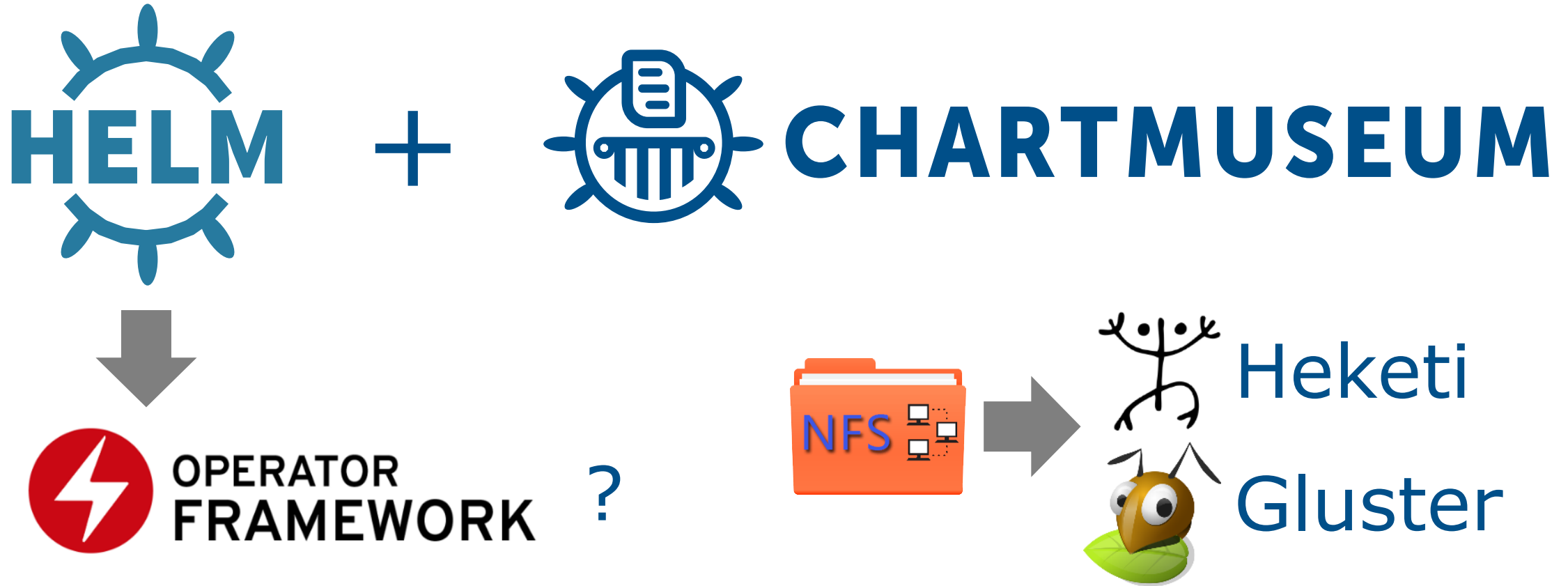
Versioned **Charts** with documented parameters
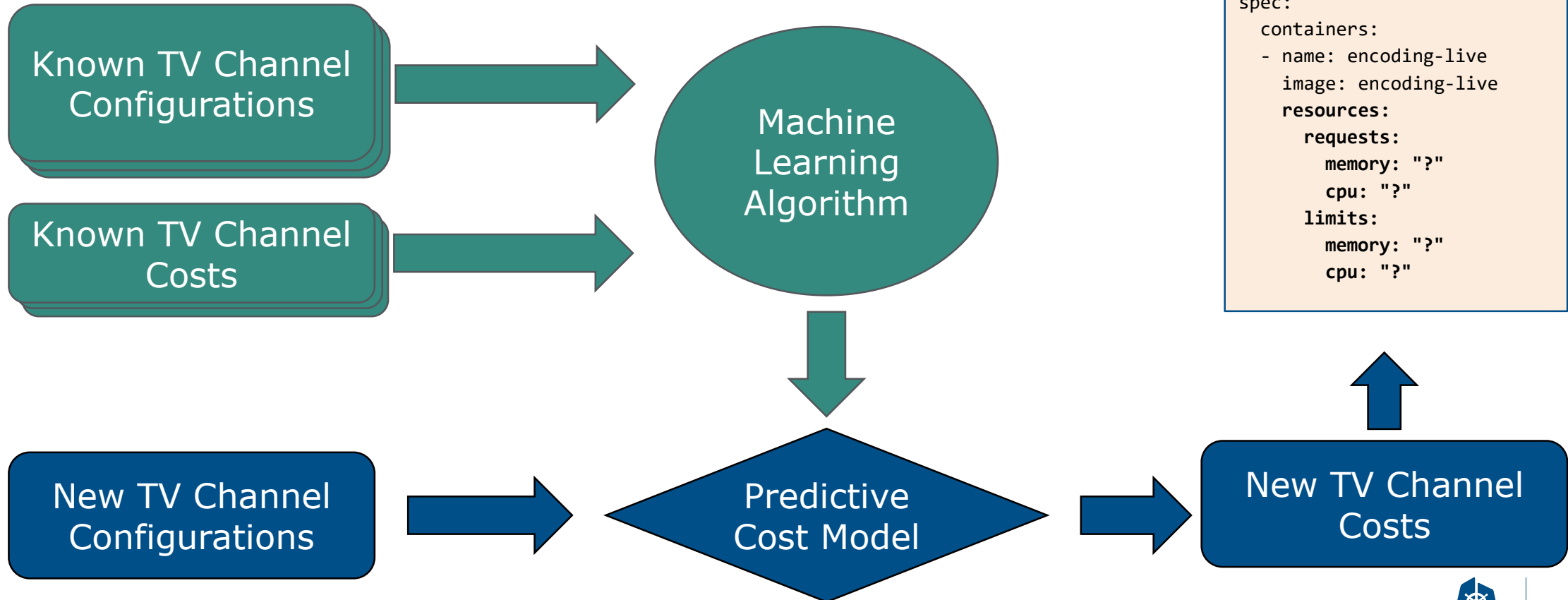
Common solution blueprints

Multiple deployment patterns!!!

Evolution of application deployment

What about resource requests?

Known TV Channel Configurations → **Machine Learning Algorithm**

Known TV Channel Costs →

New TV Channel Configurations → **Predictive Cost Model** → **New TV Channel Costs**

```
apiVersion: v1
kind: Pod
metadata:
  name: encoding-live
spec:
  containers:
  - name: encoding-live
    image: encoding-live
    resources:
      requests:
        memory: "?"
        cpu: "?"
      limits:
        memory: "?"
        cpu: "?"
```
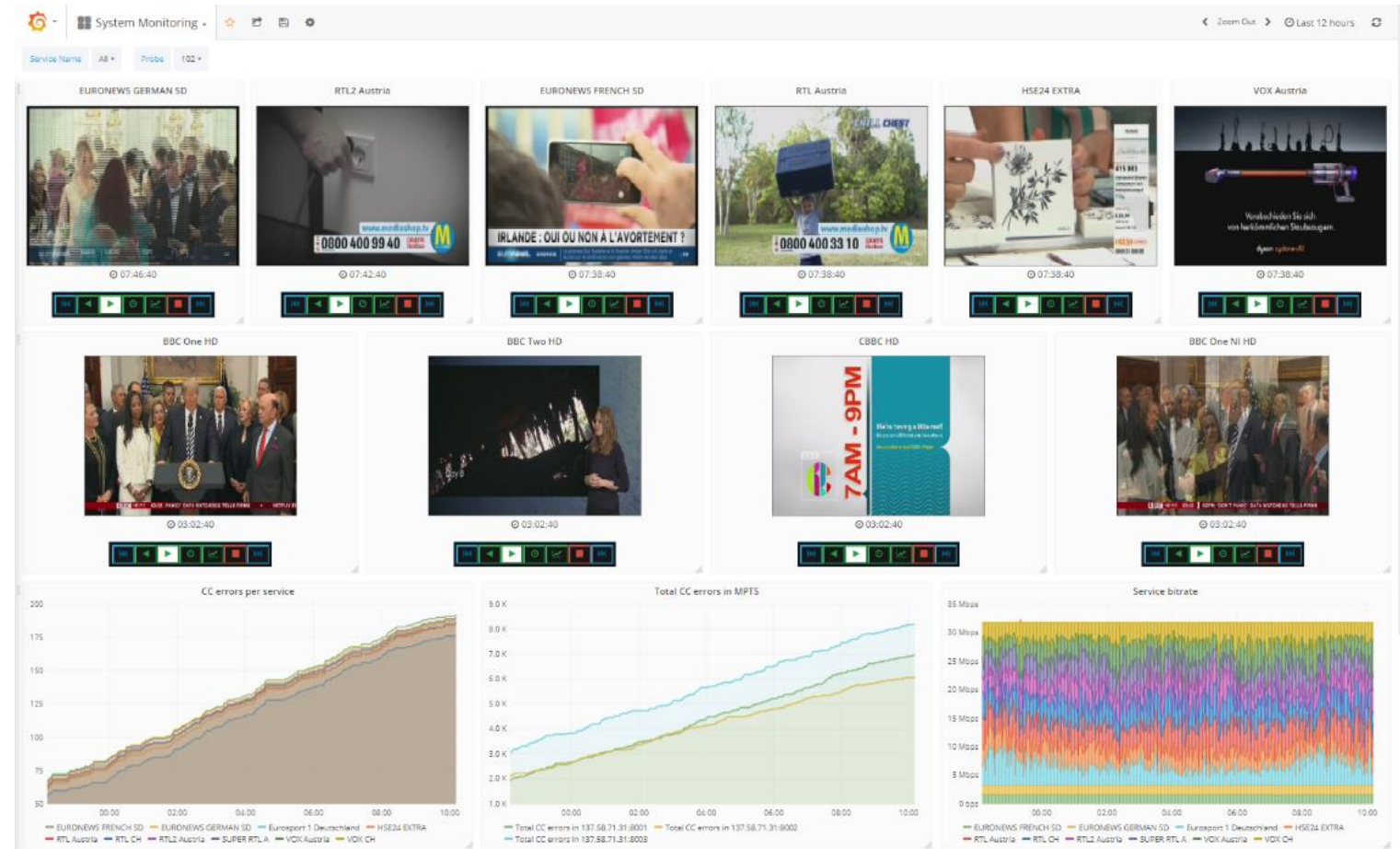
Monitoring TV Operations

- Monitoring and Analytics frameworks are the same as general IT
  - TV-aware service monitoring is needed
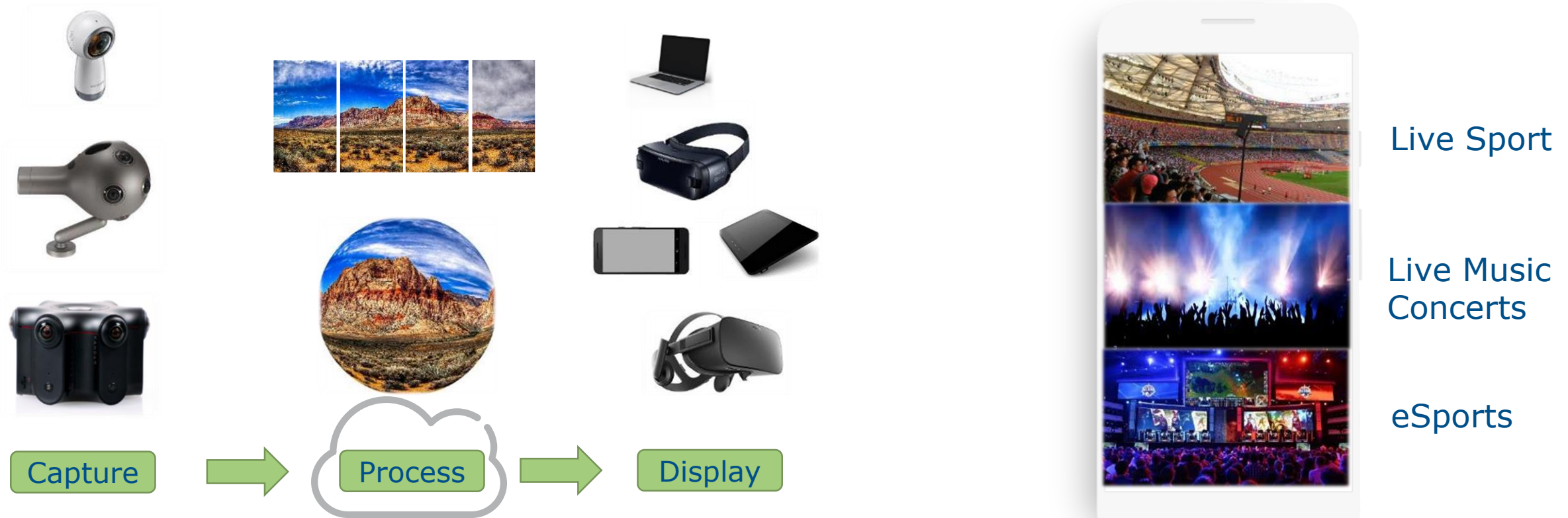 - TV control applications are simplified
- TV and IT operations converge

360° augmented viewing experience

Capture → Process → Display

Live Sport

Live Music Concerts

eSports

- Transport the viewer immediately into the live action
- Deliver a perspective that would not be possible, even from the most expensive seat in the house
- VR experience but also social and personalized on handset devices

MAGENTA VR APP

tiled media

INVR WWW.INVR.SPACE

MAGNUM FILM

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Autoscaling: More metrics please!

▸ **From stateful encoders**

▸ **To stateless encoding jobs**
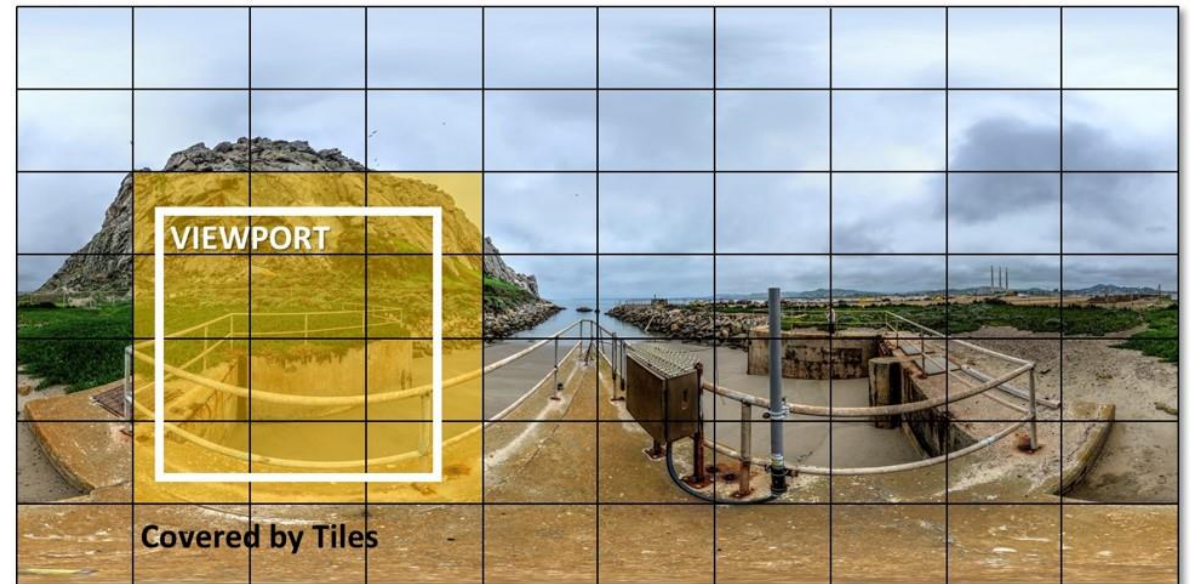
What about H/V Pod Scalers?

Yes, but with custom metrics?

Will you watch TV differently?

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▸ Jerome Champetier – jerome.champetier@mediakind.com