

IP for live production

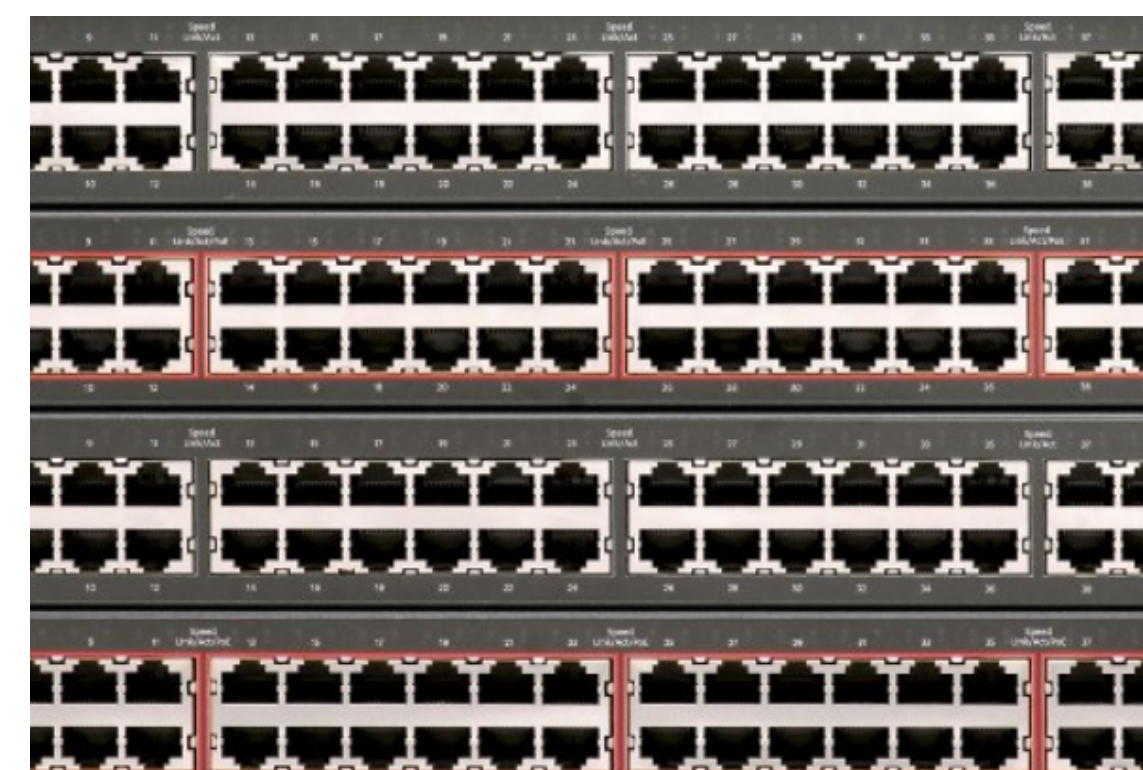
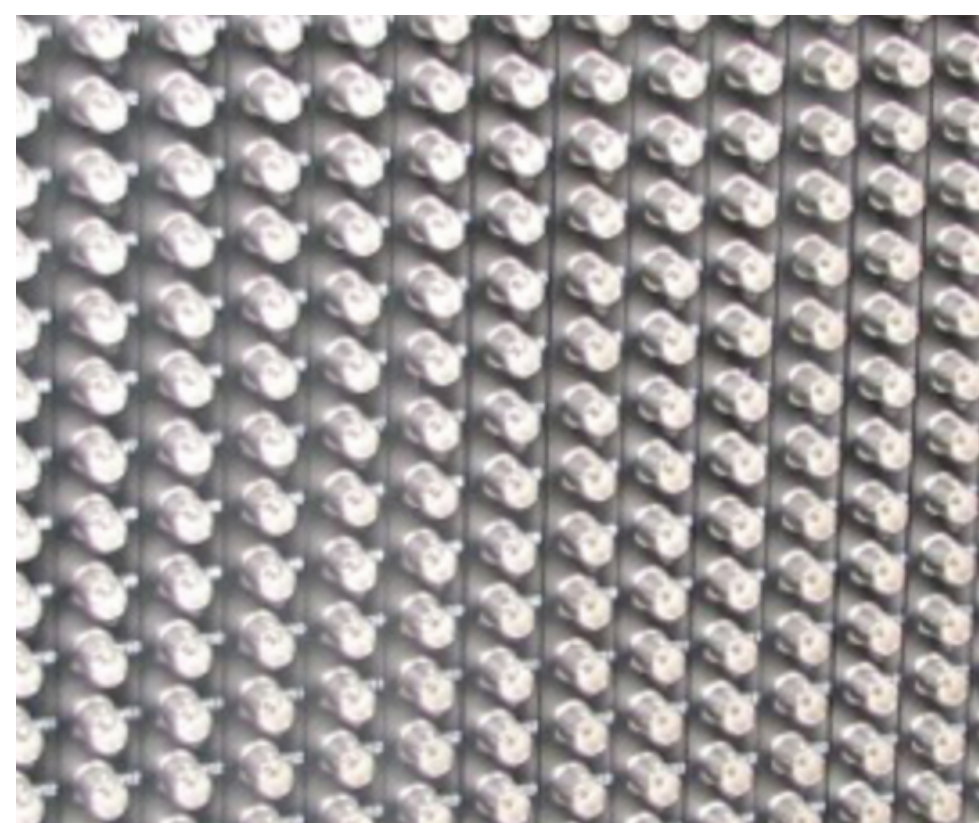
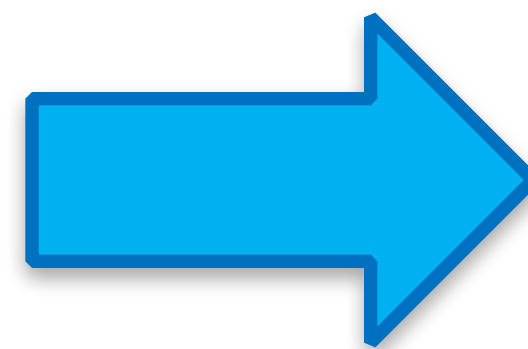
Migration and interoperability

YANA 0318

Peter Brightwell, BBC R&D



Broadcast production facilities: Industry's current concern



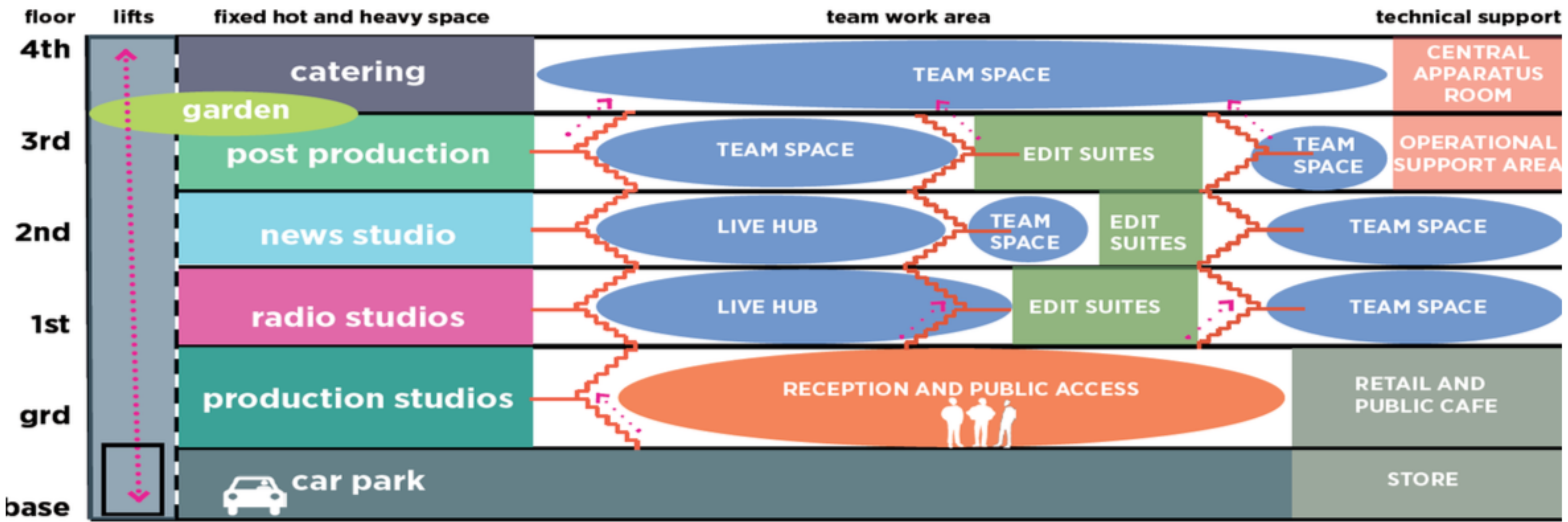
Cardiff Central Square

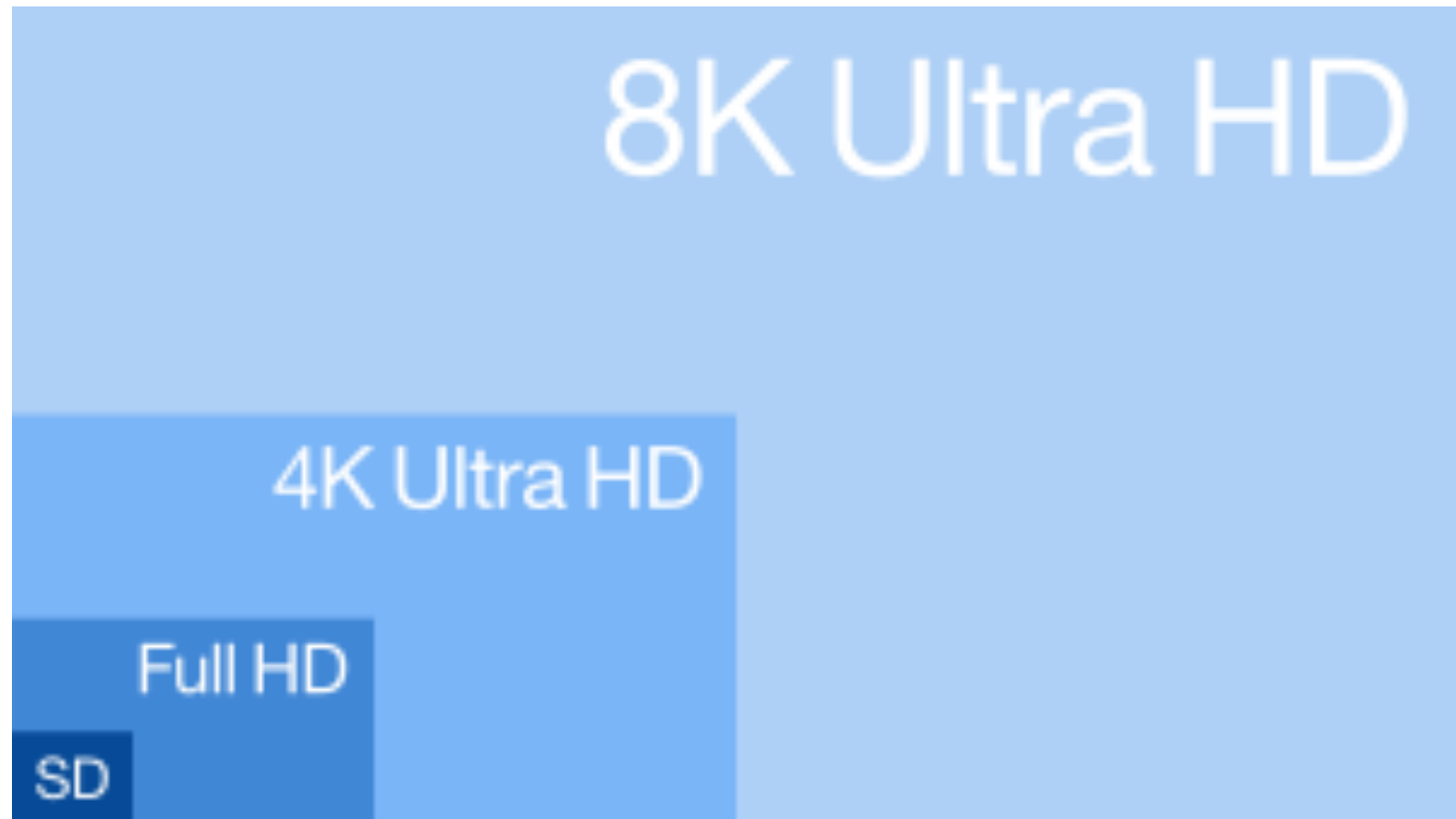


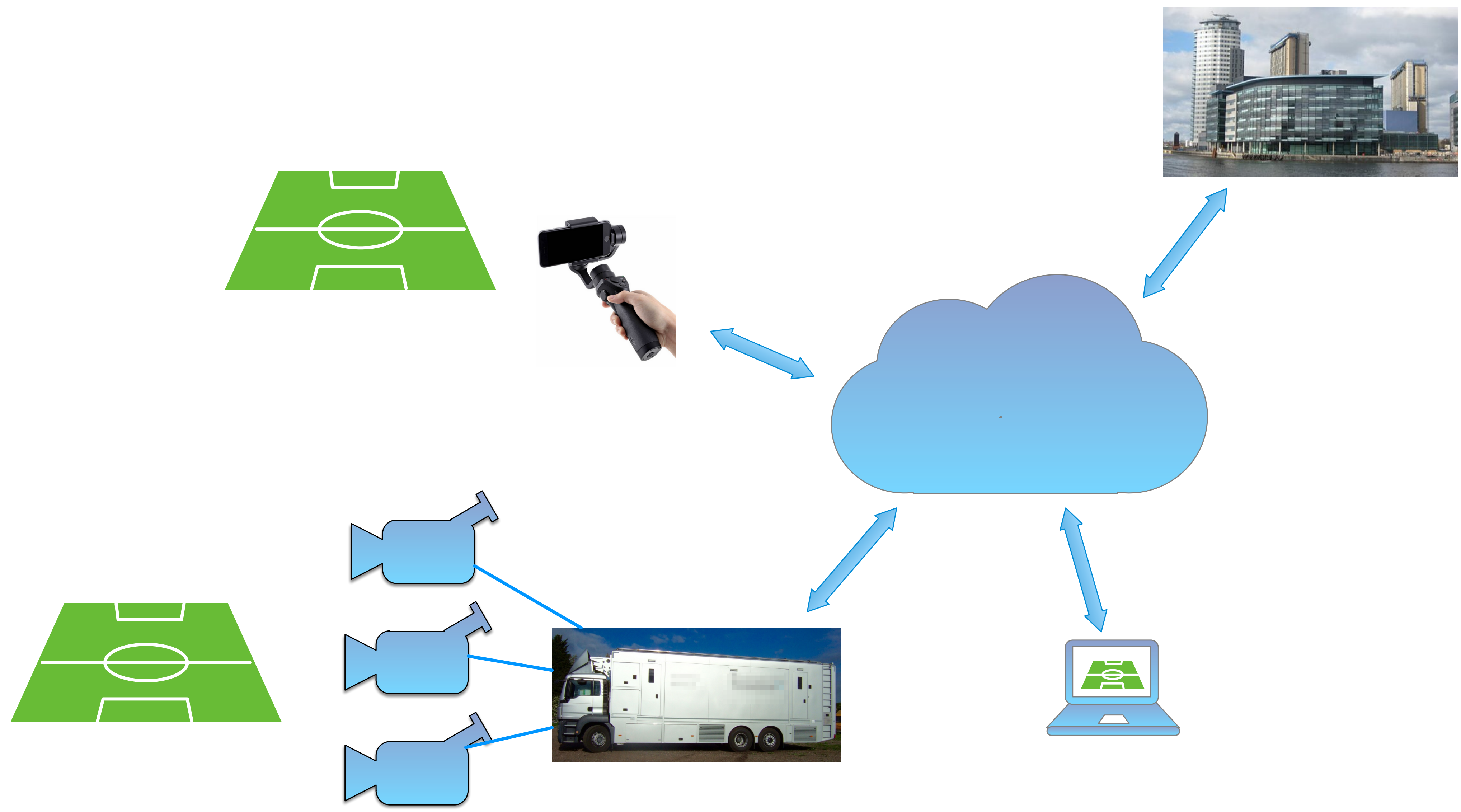
Cardiff Central Square



Cardiff Central Square







Some challenges for the industry

Extending beyond the facility

Extending beyond uncompressed

Extending beyond all-live

Extending beyond “analogue” workflows

Extending beyond “wire-orientated” standardisation

Extending beyond niche approaches

Doing all that in an interoperable way



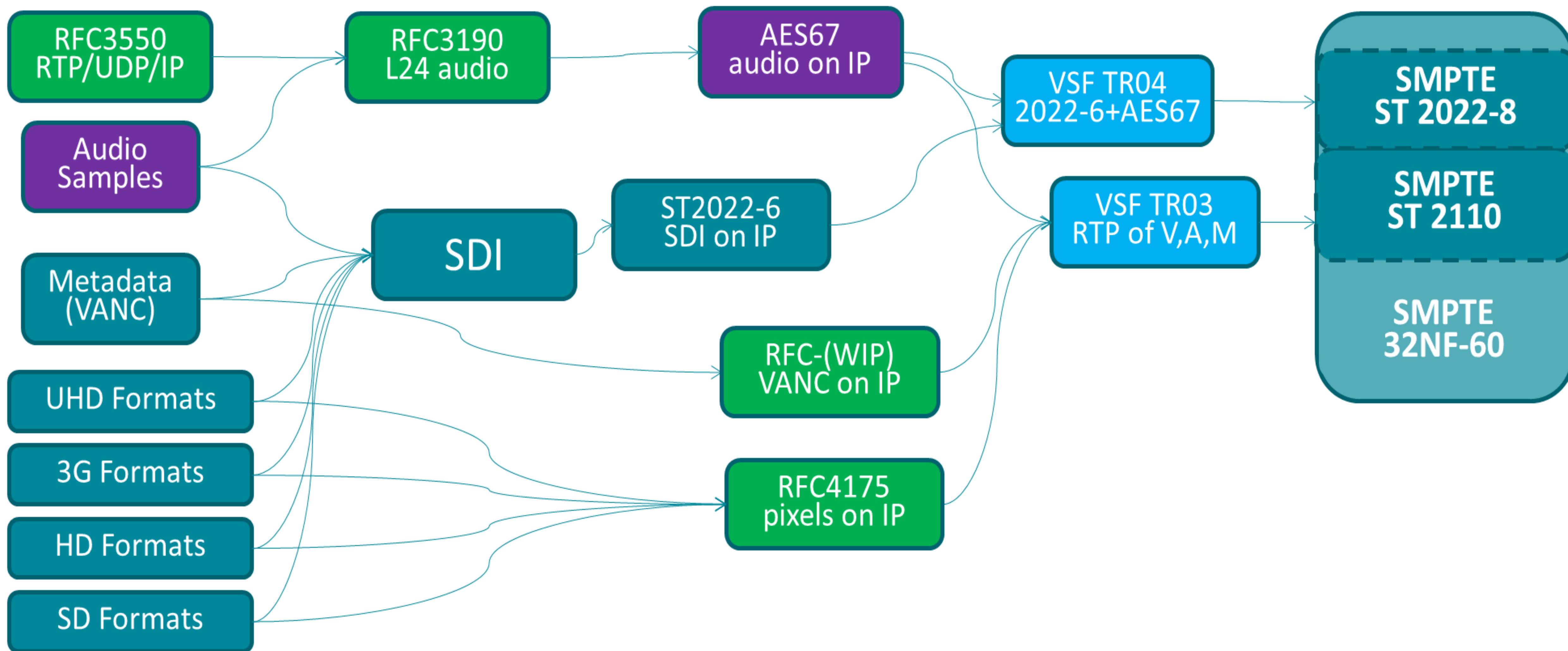
Transport

A blurred, high-speed train is captured in motion at a modern station platform. The train is moving from left to right, creating a sense of speed and motion. The platform features a tactile paving strip with the word 'WAIT' visible. The background shows the curved architecture of the station with overhead lighting.

Low-latency uncompressed currently dominates within the facility. Often multicast.

Interest growing in:

- Mezzanine compression
- Resilient protocols
- Encryption



SMPTE ST 2110

Professional Media over Managed IP Networks

2110-10: System timing and definitions

2110-20: Uncompressed active video

2110-21: Traffic shaping and
delivery timing for video

2110-30: PCM audio

2110-31: AES-3 transparent transport

2110-40: Ancillary data



Timing and synchronisation



Traditionally:

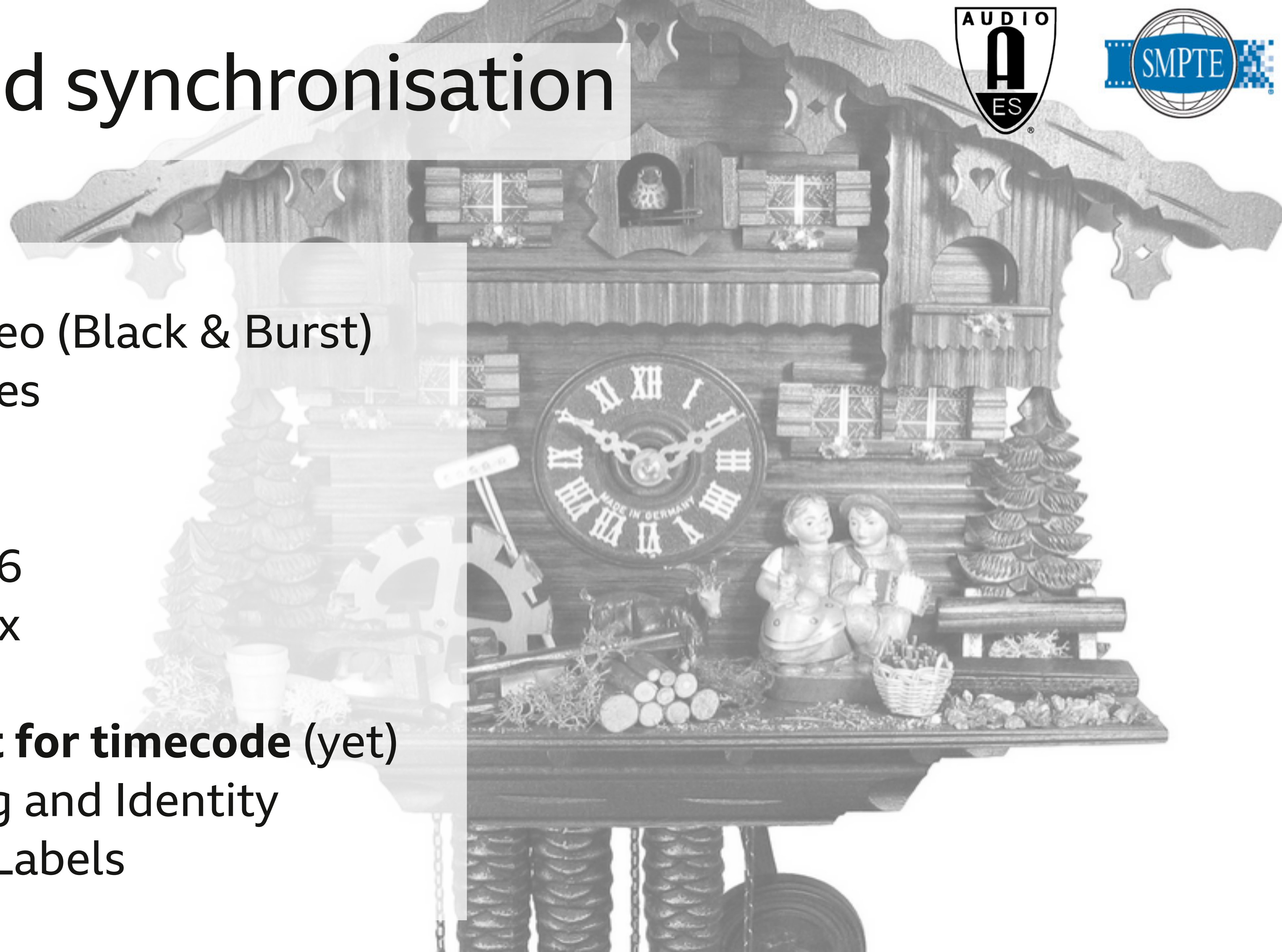
- Reference video (Black & Burst)
- 12M Timecodes

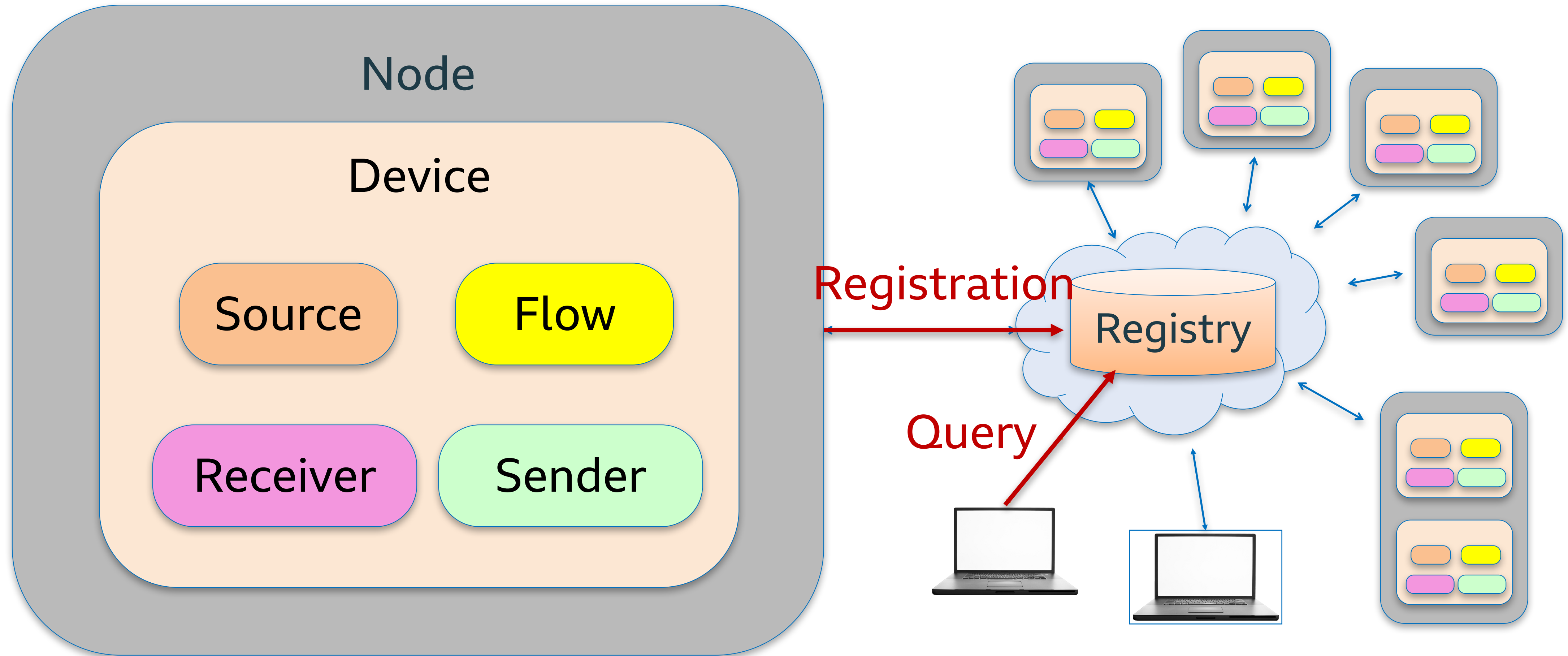
PTP (IEEE 1588)

- AES-R16-2006
- SMPTE 2059-x

No replacement for timecode (yet)

- AMWA Timing and Identity
- SMPTE Time Labels





Connection



Traditionally: cross-point routers

Various proprietary mechanisms

SDN controlled

IGMP-based

AMWA NMOS IS-05 and IS-06

Levels of connection

- Device-device
- Source-destination
- Bundled connections

Control

Traditionally:

- Vendor-specific
- “Glue” controllers e.g. BNCS

SNMP MIB (IEC 62379)

OCA/AES-70

Ember+

ST 2071

DDS

NMOS



JT-NM Roadmap of Networked Media Open Interoperability*



LEGEND:

- Standard / Specification (arrow with diamond)
- Published (arrow with square)
- Widely available (arrow with circle)
- Study / Activity (rectangle)

IV. Dematerialized facilities**

EBU R146 *Cloud Security for Media Companies*

AMWA Content Model and APIs *Agile Media Machine Core*

JT-NM Security Recommendations *"Top-Ten" Security Tests*

Cloud-fit
Open, secure, public/private
(on-premise) cloud solutions

Non-media-specific IT
Self-describing, open APIs
suitable for virtualization

III. Network & Resource Management

AMWA Event & Tally

AMWA Timing and Identity *Self-describing content*

AMWA IS-06 *Network Control*

AMWA IS-05 *Connection management*

AMWA IS-04 *Discovery & Registration*

Automated resource management for
more flexible and sharable
infrastructure provisioning
at scale

II. Elementary flows

VSF TR-03

SMPTE ST 2110 *Transport of separate essences*

SMPTE ST 2059 *Timing profile*

AES67

ST 2022-8

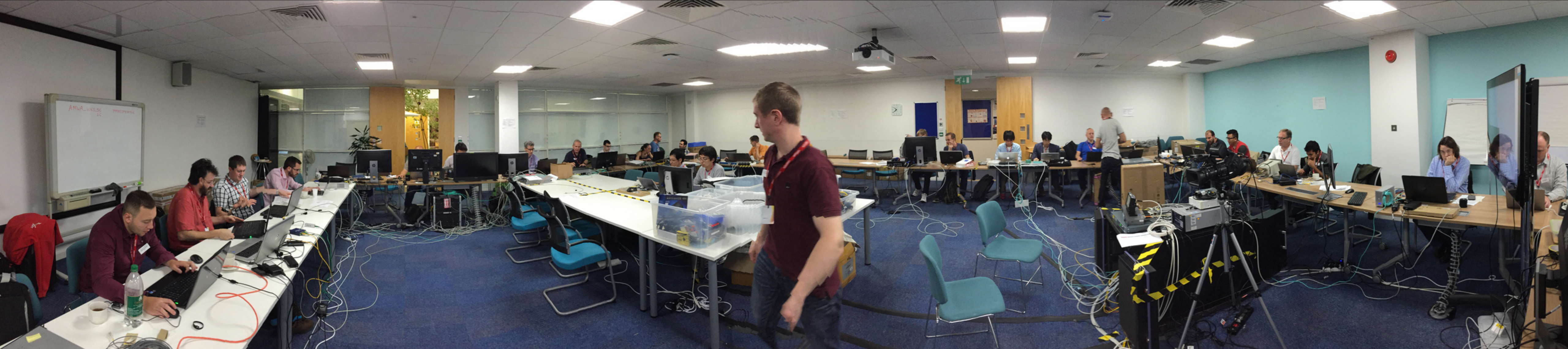
More flexible and efficient workflows
New formats like UHD
and mezzanine compression

I. SDI over IP
SMPTE ST 2022-6

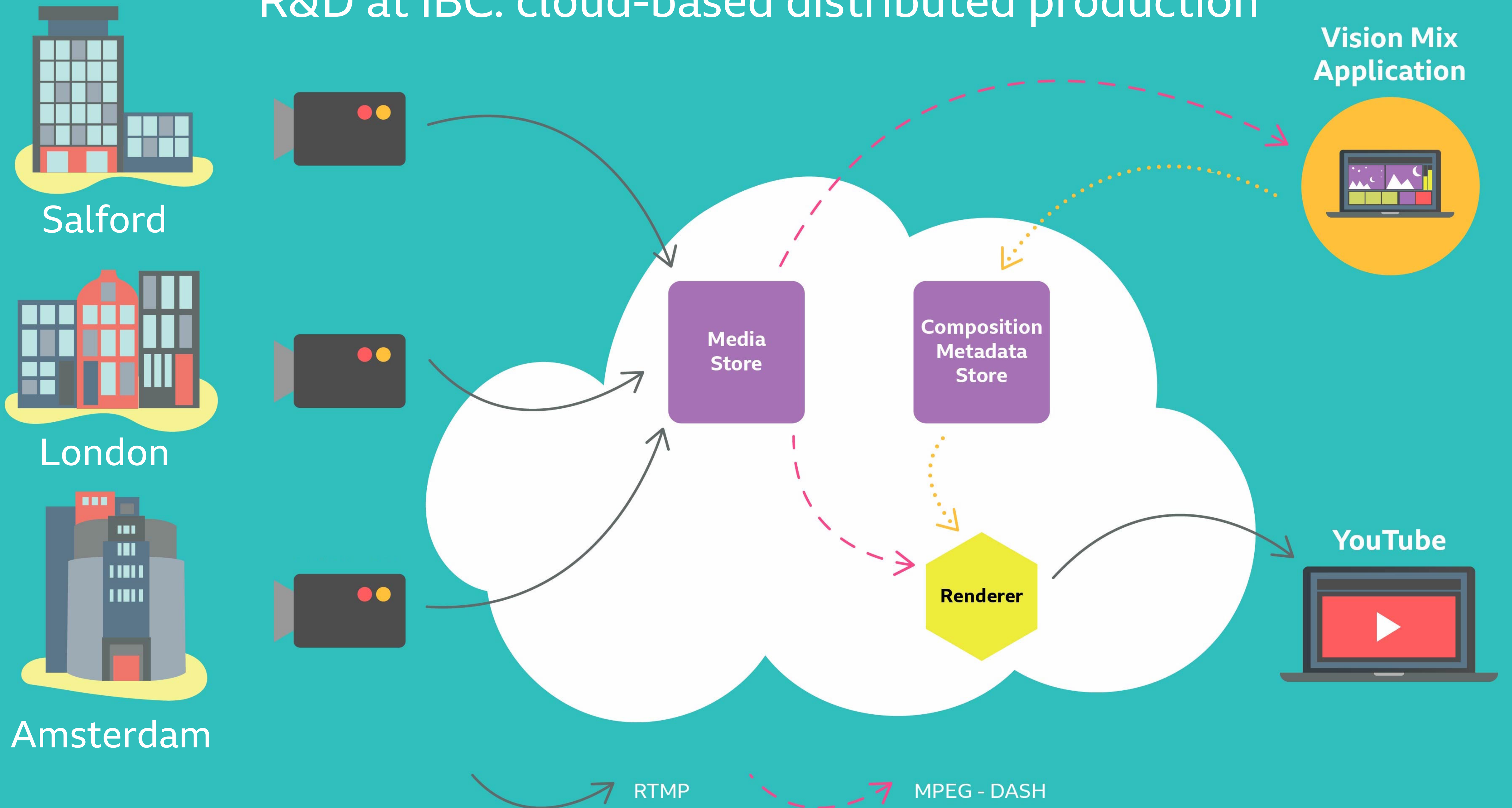
0. SDI

Current and mature technology


AMWA Networked Media Incubator



R&D at IBC: cloud-based distributed production



Preview



1 CAM 1

CUT >

MIX >

CUT TO FALLBK

LIVE Transmission 00:59:01




2 CAM 2

MUTE


Audio +




Cameras and stills +



1 CAM 1




2 CAM 2




3 CAM 1 zoom

VT sources +

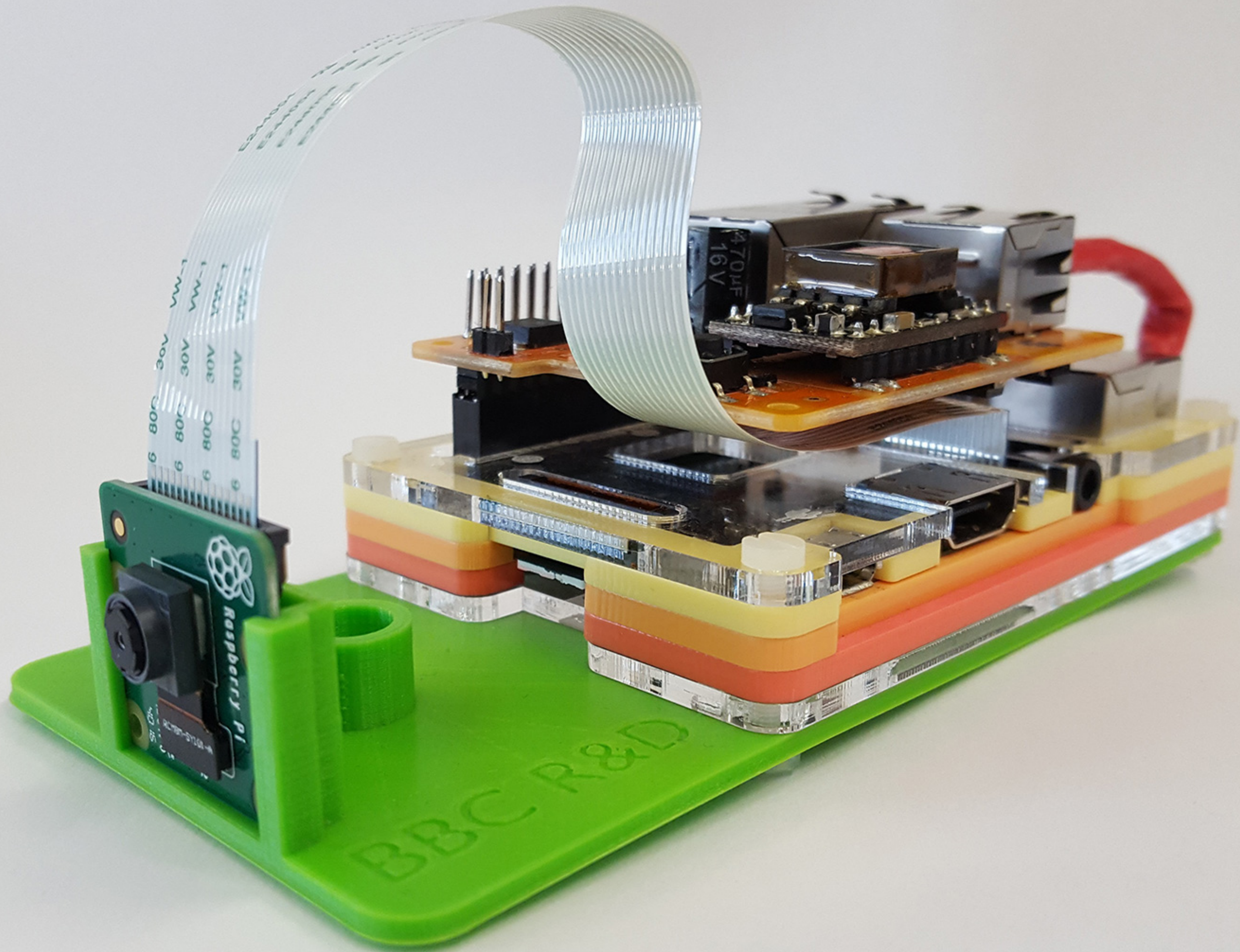


a Intro sting

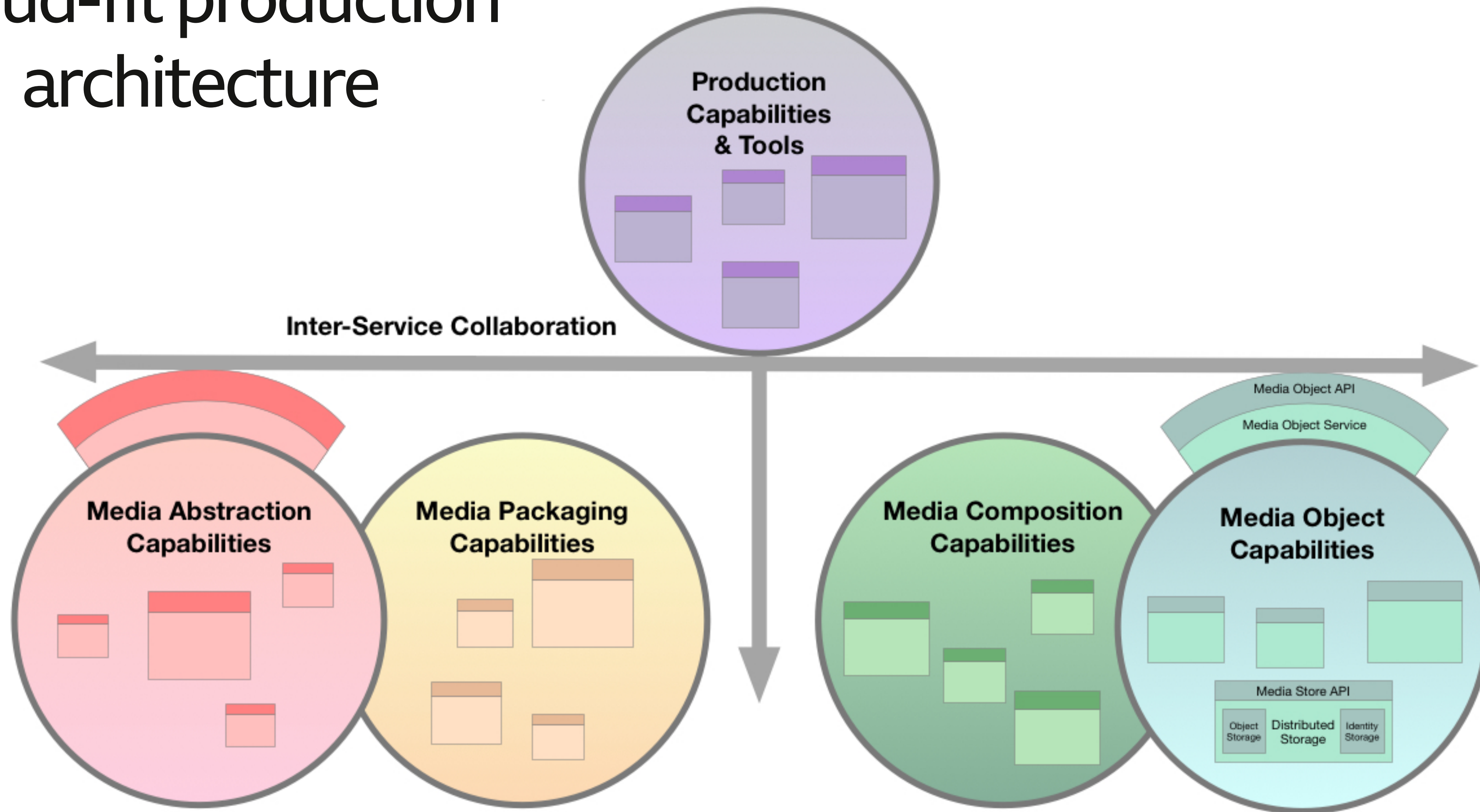
Overlay graphics +



b BBC DOG



“Cloud-fit production” architecture



[www.bbc.co.uk
/rd/projects/ip-studio](http://www.bbc.co.uk/rd/projects/ip-studio)

