



# RTL City Luxembourg Our Journey, 74 Weeks Later

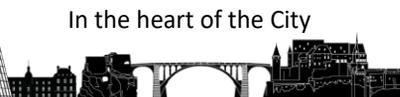
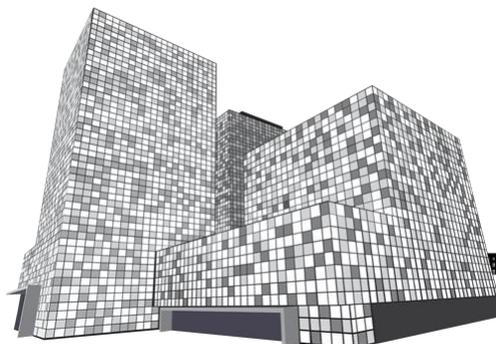
Costas Colombus, Director of Technology Projects and Support  
BROADCASTING CENTER EUROPE S.A.



IP SHOWCASE THEATRE AT IBC – SEPT. 14-18, 2018



## • RTL CITY

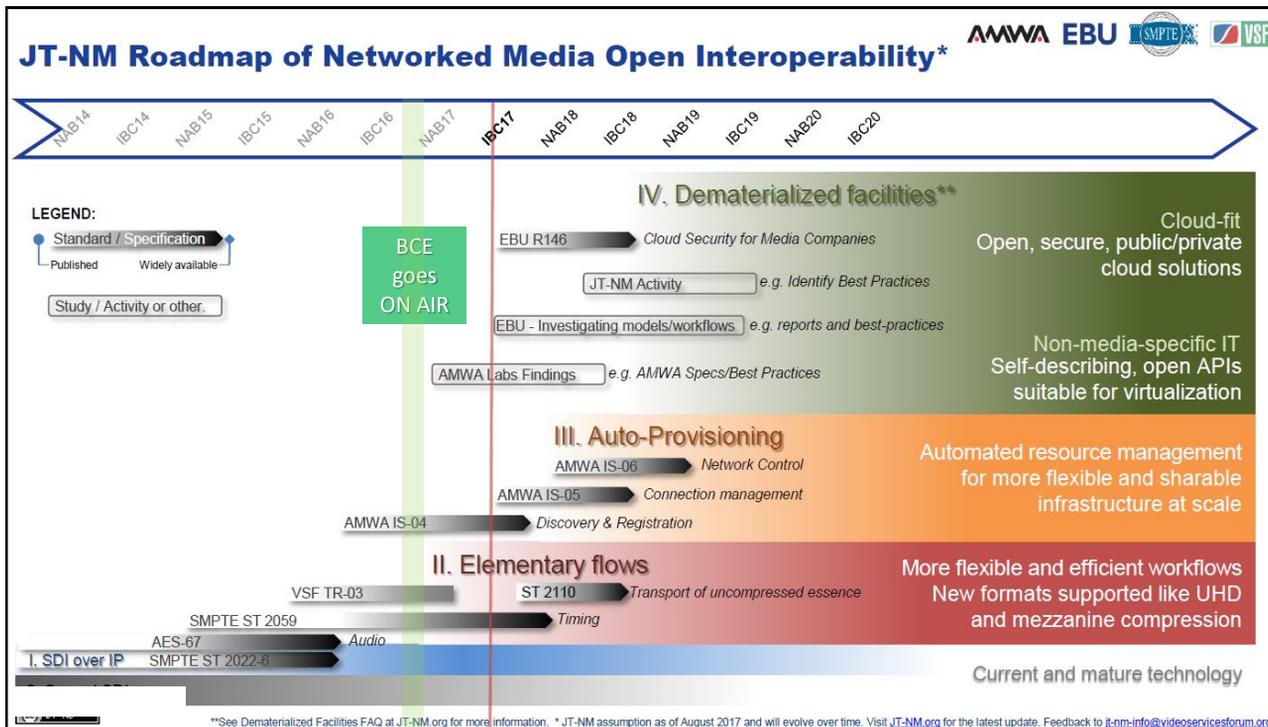




## TV Technology Buzz

- Familiar trend for the last years in our industry
- Since 2011 gains in popularity every year
- Even in 2018 is **not number one trend...** but 4K (or more?) is emerging
- Not many big projects had been realized so far, now?
- But still...
- BCE had to fulfill a **really tight** schedule





## Preliminary Requirements

- **Format Agnostic (1080p, 4K) – Future proof**
- **Flexibility, Scalability**
- **Redundancy, Reliability**
- **Cost savings on cabling, installation**
- **Reduce TCO**
- **Reduced complexity**
- **Multivendor selection**
- **COTS equipment**
- **Innovation**





## Achievement vs expectations

- ✓ **Format Agnostic (1080p, 4K) – Future proof**
- ✓ **Flexibility, Scalability**
- ✓ **Redundancy, Reliability**
- ✓ **Cost savings on cabling, installation**
- Reduce TCO
- Reduced complexity, well almost...
- ✓ **Multivendor selection**
- COTS equipment
- ✓ **Innovation**



## Standards applied today @ BCE

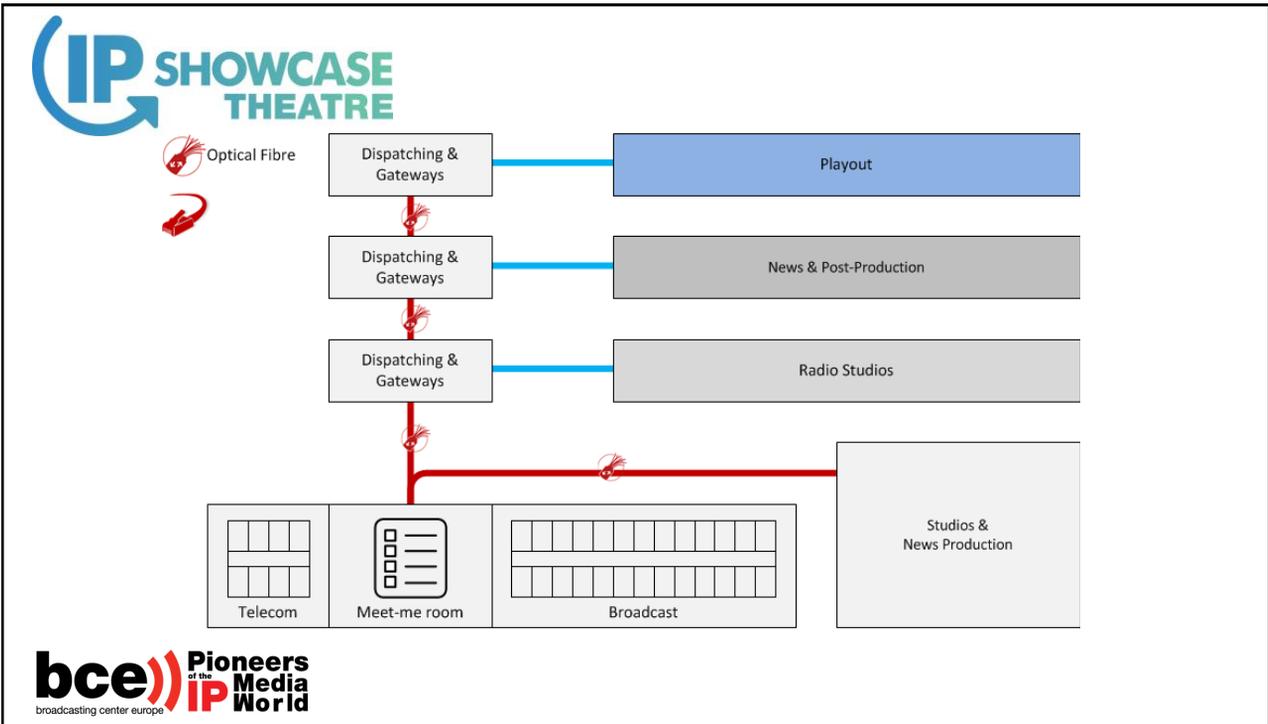
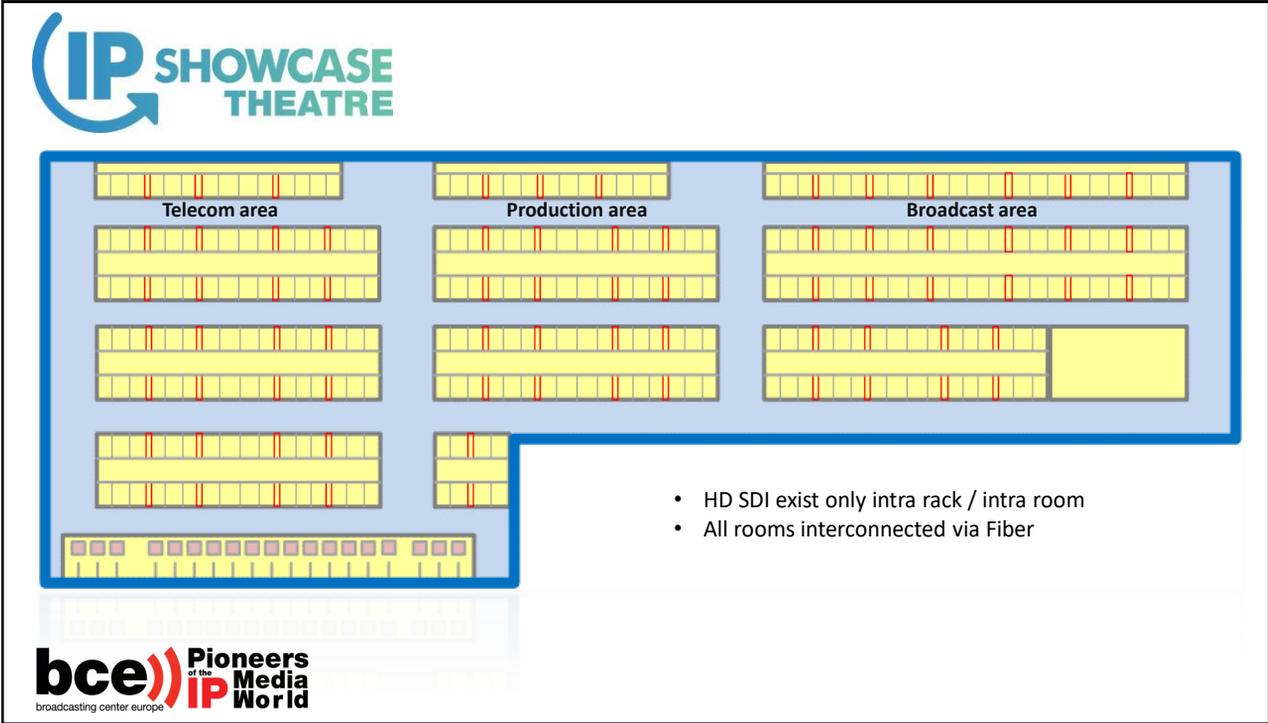
### November 2017

- SMPTE ST 2022-6/-7 for SDI over IP

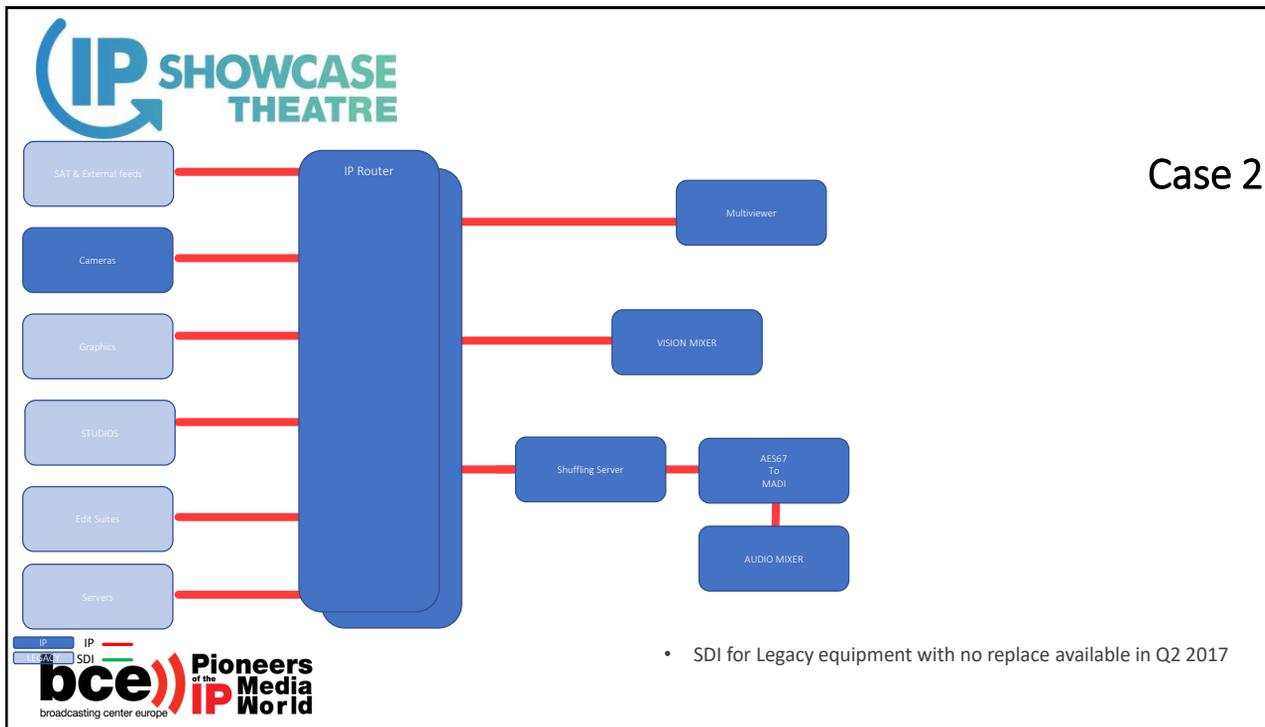
and

- AES67 for audio over IP
- DANTE In use at RTL Radio
- PTPv2 (IEEE1588)
- PTPv1 for Dante
- TR04
- **Software upgrades unlock future standardization (e.g. ST2110 family)**









**IP SHOWCASE THEATRE**

**Key Components**

**ARISTA JUNIPER NETWORKS**

- Network Switches and Optics

<p><b>GV</b></p> <ul style="list-style-type: none"> <li>• IQMIX gateway</li> <li>• IQMADI audio gw</li> <li>• Audio Shuffler</li> <li>• Routing Controller</li> <li>• Vision Mixer</li> </ul>	<p><b>harmonic</b></p> <ul style="list-style-type: none"> <li>• Servers</li> <li>• Encoders</li> </ul> <p><b>GV</b></p> <ul style="list-style-type: none"> <li>• Cameras</li> </ul> <p><b>STUDER</b> by HARMAN</p> <ul style="list-style-type: none"> <li>• Audio Mixer</li> </ul>	<p><b>Tektronix</b></p> <ul style="list-style-type: none"> <li>• SPG/PTP Generator</li> <li>• T&amp;M</li> </ul> <p><b>MEIBERG</b></p> <ul style="list-style-type: none"> <li>• PTP Master Clock</li> </ul> <p><b>DHD.audio</b></p> <ul style="list-style-type: none"> <li>• Audio Mix &amp; Routing for radio</li> </ul>
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**bce** broadcasting center europe | **Pioneers of the IP Media World** of the IP media world

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### Our IP Router size

**19/06/2017**

- Video Level

964 x 1496



**04/12/2017**

• Video Level 1016 x 1540

• **Video Level 1024 x 1564**

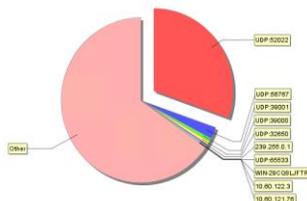
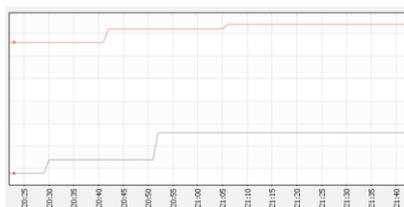
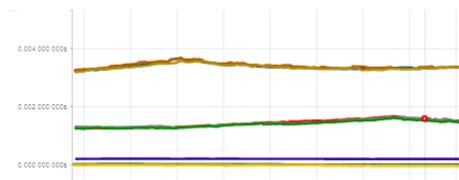
**52 x 44**

**Increase with Software configuration and simple equipment connection**



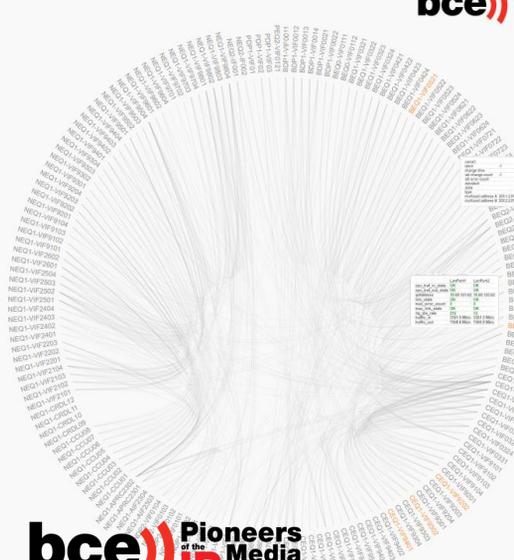
### Monitoring and Logging

- DATAMINER (Alarms)
- PRTG, Syslog and sFlow (Logging)
- TIMEKEEPER (Timing Monitoring)





## bce)) Video over IP Monitoring



	LanPort1	LanPort2
cpu_traf_in_state	OK	OK
cpu_traf_out_state	OK	OK
ipAddress	10.60.121.62	10.60.123.62
link_state	OK	OK
mac_error_count	5	5
mac_link_state	OK	OK
rtp_dis_rate	274	74
traffic_in	3381.5 Mb/s	3381.5 Mb/s
traffic_out	7508.8 Mb/s	7508.8 Mb/s

name3	
ident	-1
change time	
sdi change count	-1
sdi error count	
standard	
state	
type	
multicast address A	239.1.2.81
multicast address B	239.2.2.81

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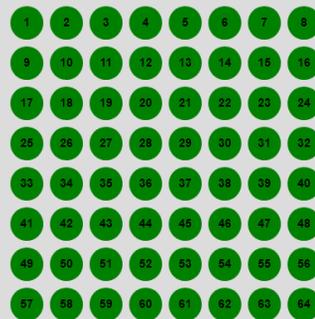
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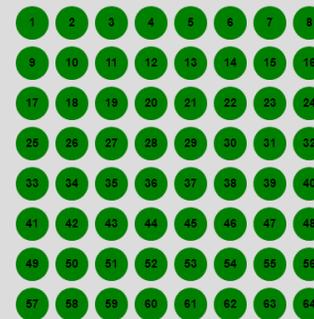
## BCE Monitoring Tool example 2

### bce)) Audio Shuffler Monitoring

Audio XS APRC2301  
Network State: OK  
Proc Health: OK  
Reference Source: Input Stream 64  
Reference State: OK: Used Primary timing reference  
System Latency: 5



Audio XS APRC2302  
Network State: OK  
Proc Health: OK  
Reference Source: Input Stream 64  
Reference State: OK: Used Primary timing reference  
System Latency: 4



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Curated by the Video Services Forum vsf.tv

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## Key Findings

- Design period is the most important, do not underestimate the complexity
- Test, PoC and then test again
- **Skillset of Broadcast Engineer**
  - **Needs to be adapted**
- Monitoring solutions do not really exist
- Time to react
  - Being proactive



## Other Findings

- Two different vendors for the dual central switches
  - Hardware and/or software redundancy
- Monolithic network switches removes complexity
- Clean switching is not mandatory for most of the signals
- Do not underestimate the switch latency behaviour for playout systems
- Third party brands integration is complex and time consuming





## Hints

- IP control systems can be single point of failure
- Test Inbound control layer using packet storm or any feasible method
- PTP distribution performance and scalability
  - Originally we had serious limitations
- **Fiber connectivity and QSFP's**
  - Absolute clean fiber connectivity, Validate the QSFP quality
- Compliance of the IP edge devices with respect to specifications or recommendations
  - Future proof system



Thank you



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