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# Real Radio Hosts Working Virtually:

## How Real Humans Work with Containerized Broadcast Systems





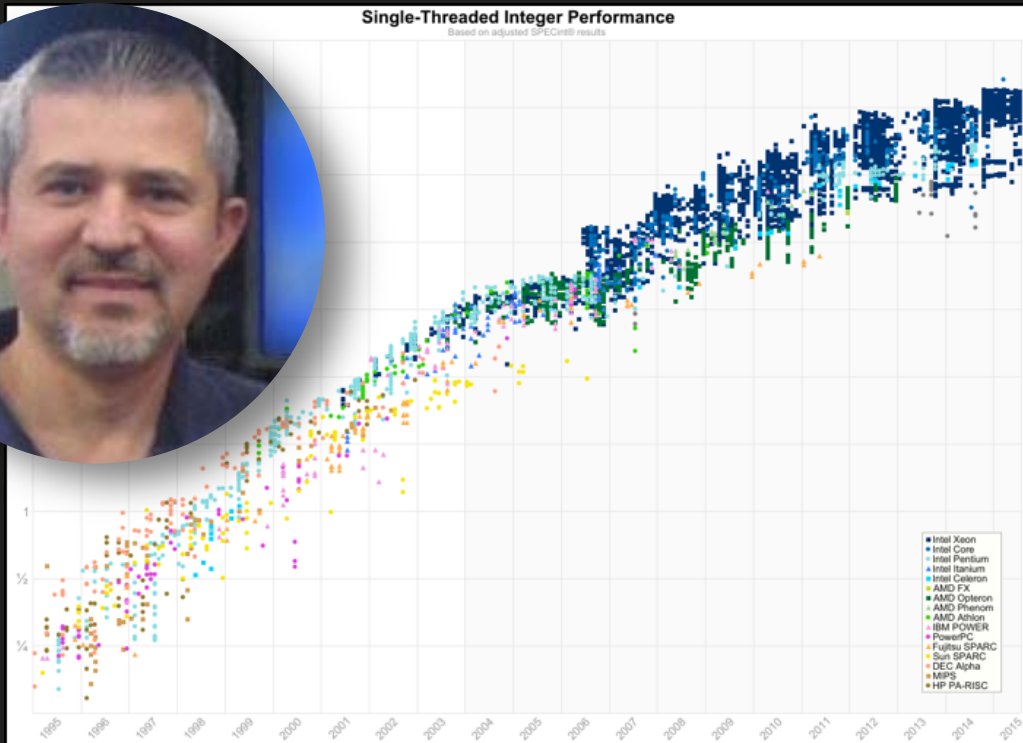
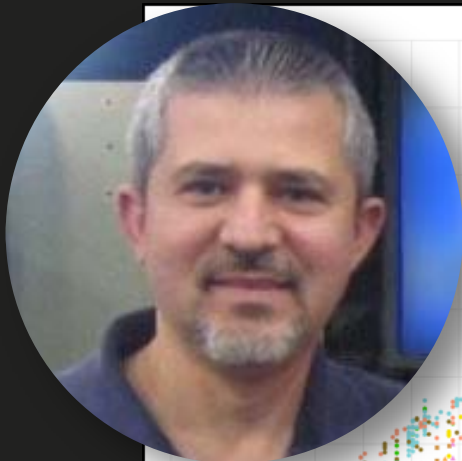
**Kirk Anders Harnack**  
Senior Solutions Consultant  
Telos Alliance



# 40 Years of Broadcast Tech on 5 Slides



# 40 Years of Broadcast Tech on 5 Slides



**CPUs Got More Powerful. A Lot More.**

**Ioan Rus**, Senior Coding Developer at **Telos Alliance**, explains...

“We moved from a purpose-built world to a more generic platform world. Commodity hardware and commodity software is largely able to replace their proprietary predecessors.”



# 40 Years of Broadcast Tech on 5 Slides





# 40 Years of Broadcast Tech on 5 Slides



# 40 Years of Broadcast Tech on 5 Slides



IP Intercoms



Virtual Mixers



IP Codecs



Audio Processors



Talkshow Systems



Automation  
Playback





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# IP is the Most Versatile Tool ever adopted in Broadcasting

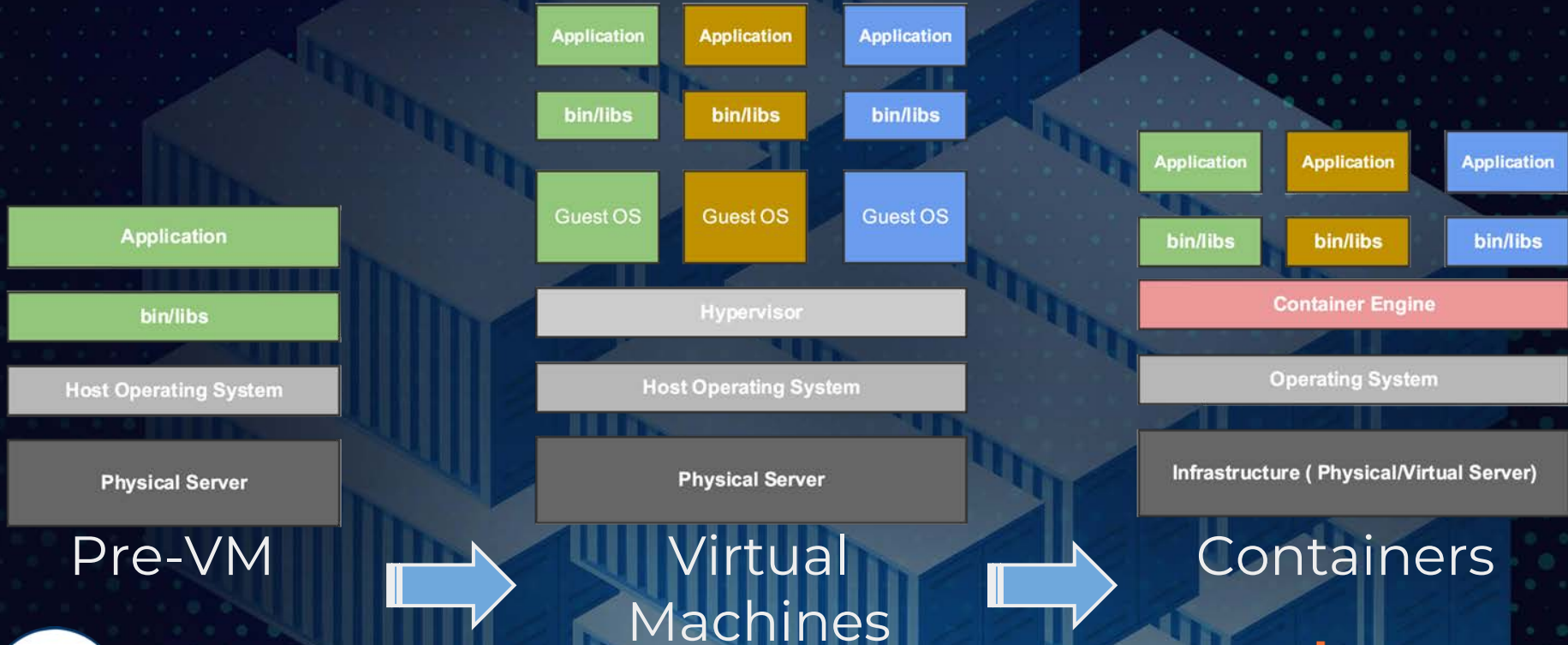


# What if?

- Broadcast equipment were “apps” on a server?
  - Installed or shut off in minutes
  - Paid for only when used
  - Controlled from anywhere
    - Home
    - Other offices
    - Sports venues
    - Live remotes



# Evolution of Virtualization



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# Virtual Software Deployment

There are two main platforms for deployment of software:



Virtual Machines  
(Installed on a Hypervisor)



docker

Containerized  
Software





# Why Virtual Machines & Containers?



**Greg Shay**  
Chief Technology Officer

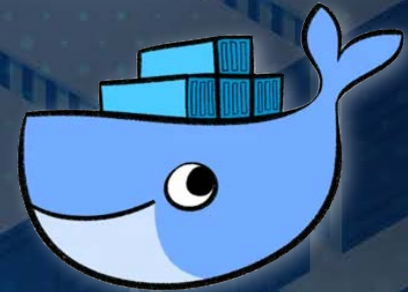
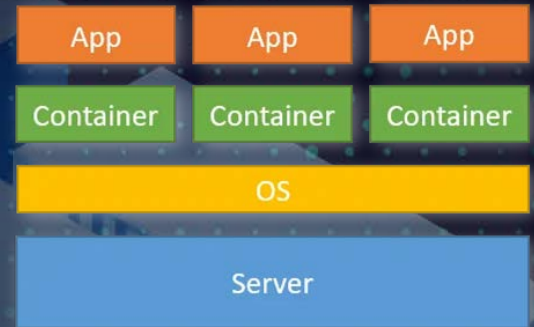




# Containerized Software

## The Future of Computing Services

- Microservices in containers are the industry future trend for software.
- Used by IT-forward-thinking large organizations like Google, Amazon, Visa, PayPal, and Metlife for critical applications.



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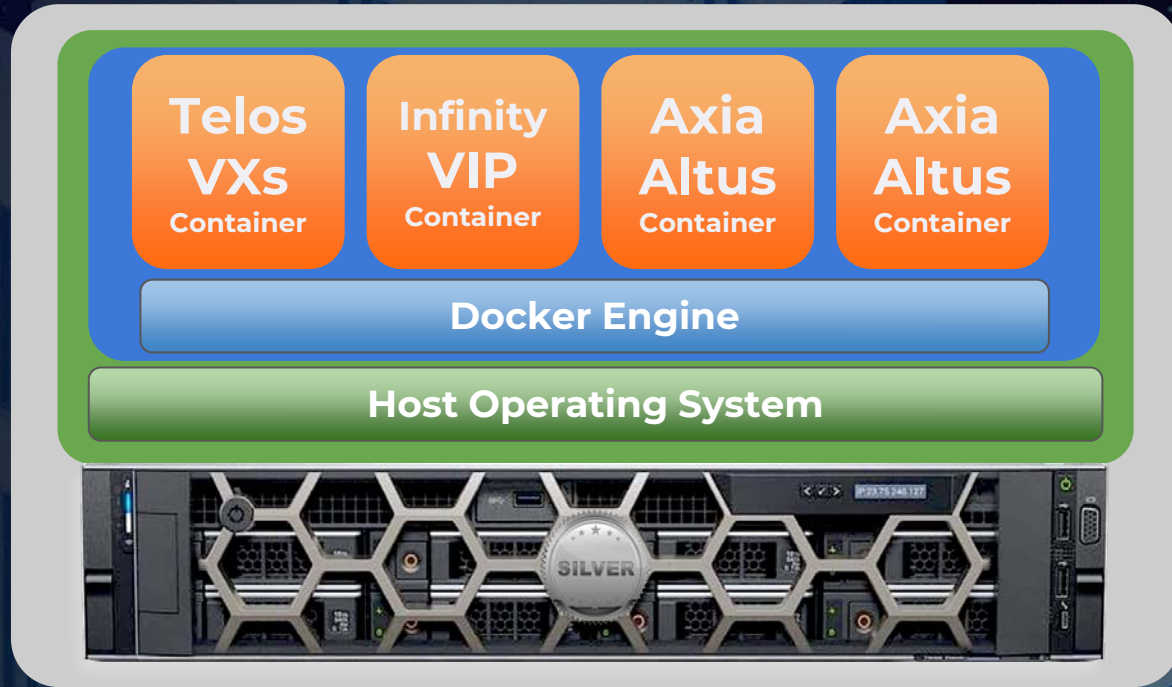
# What is Containerized Software?

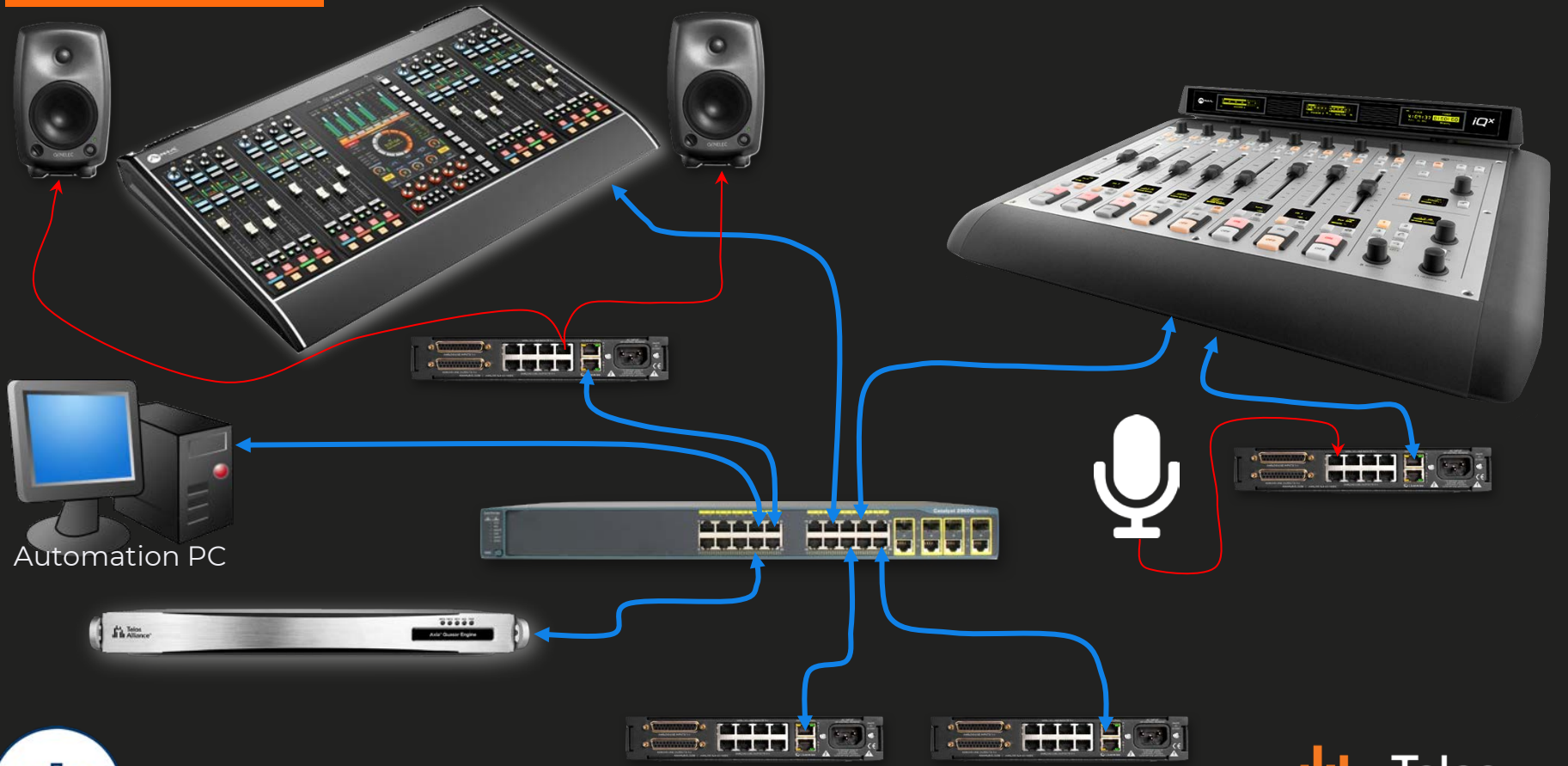


**Jake Alderman**  
Virtual Solutions Program Manager



# Different Functional Containers





Automation PC

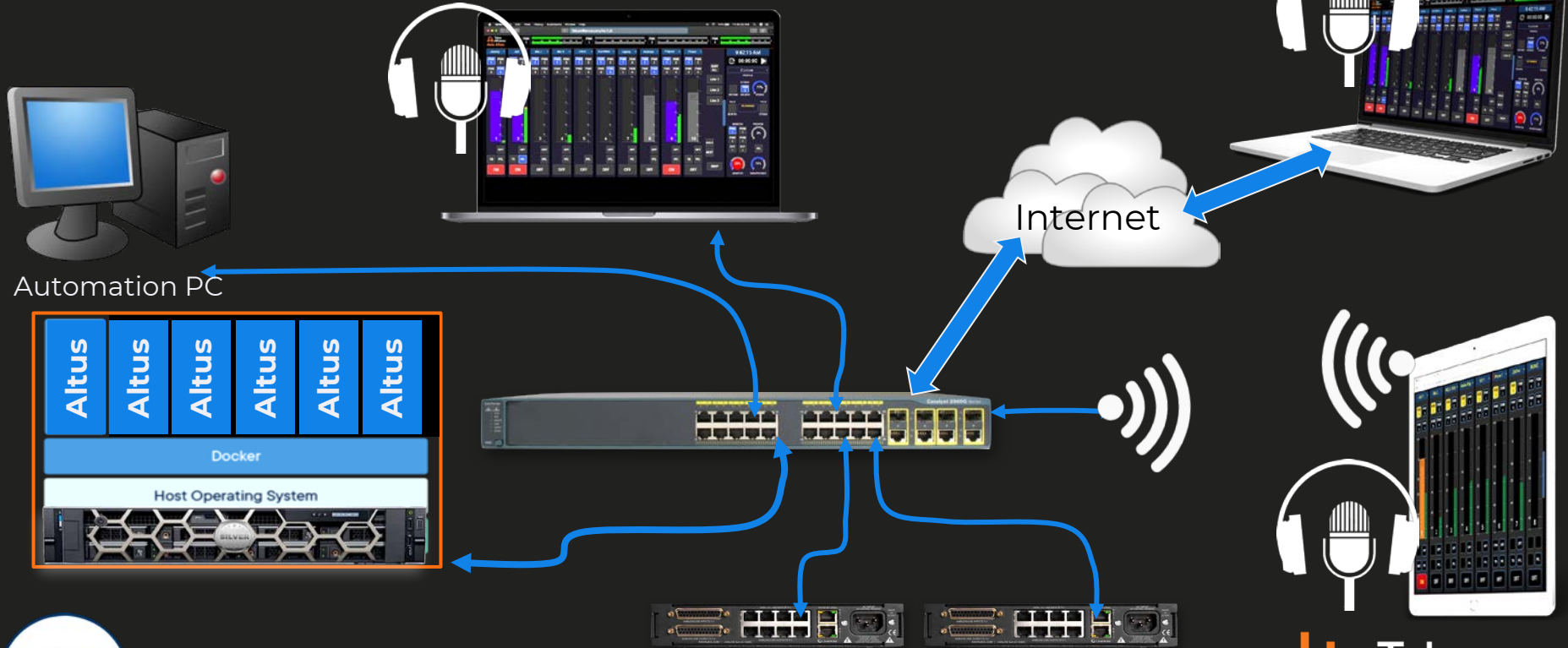








# Axia Altus is a Software Container



# Broadcast Applications

## Virtual Audio Mixer



- Audio mixing without a physical surface
  - HTML5 browser-based control
- Temporary studio anywhere
- Distributed / remote workforce
- Home studios don't need a purpose-built mixer
- Small studios, desks, even mobile
- Multiple simultaneous users



# Add to Existing Studios



- Add an audio console without buying control surface hardware.
- Add mixing for extra events like sports or holiday programs.
- Monitor and control other cluster stations.





# Create Extra Mixers

- Replace legacy audio consoles.
- Smaller footprint returns desk space.
- Fits in small rooms and on small desks.



# Mix from Any Desk

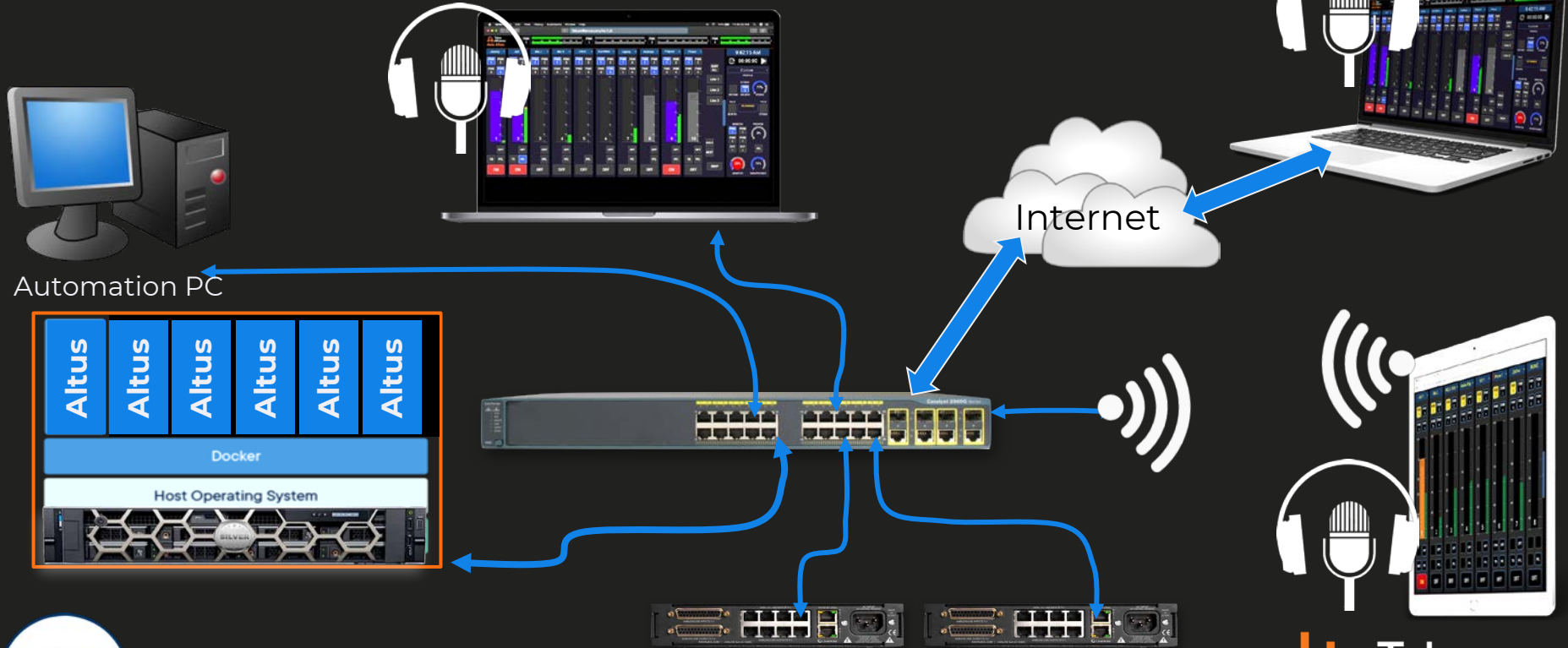


- Use existing office PCs as control surfaces.
- Works with touchscreen or mouse.
- Any desktop PC, laptop, tablet or phone controls an Axia Altus mixer.





# Axia Altus is a Software Container



# Broadcast Phone System

- Granular system sizing
- Deployment flexibility: On-Prem, Data Center, Cloud
- Buy-out or subscription
- VXs investment lasts beyond the life of purpose-built hardware



# Container-Based Virtual IP Intercom



Telos Infinity VIP





# Containers and Telos Software





# Other Software Containers

Broadcast hardware  
that isn't hard

Virtual**RACK**  
from Broadcast Dynamics



Broadcast-optimised hardware, for frictionless deployment



# Where to Deploy **Axia Altus**?

## Audio Mixer

Delivered and Installed as Software  
Controlled over a network (Local or Remote)  
Operated using a web browser

```
[root@tecmint ~]# docker run ubuntu bash -c "apt-get -y install nginx"
Reading package lists...
Building dependency tree...
Reading state information...
The following extra packages will be installed:
fontconfig-config fonts-dejavu-core geopip-database libfontconfig1
libfreetype6 libgd3 libgeopip1 libjpeg-turbo0 libjpeg8 libtiff5
libbpx1 libx11-6 libx11-data libxau6 libxcb1 libxdmcp6 libxmi2 libxpm4
libxss1.1 nginx-common nginx-core sgml-base xul-core
Suggested packages:
libgd-tools geopip-bin Fcglxwarp nginx-doc sgml-base-doc debhelper
The following NEW packages will be installed:
fontconfig-config fonts-dejavu-core geopip-database libfontconfig1
libfreetype6 libgd3 libgeopip1 libjpeg-turbo0 libjpeg8 libtiff5
libbpx1 libx11-6 libx11-data libxau6 libxcb1 libxdmcp6 libxmi2 libxpm4
libxss1.1 nginx-common nginx-core sgml-base xul-core
0 upgraded, 25 newly installed, 0 to remove and 0 not upgraded.
Need to get 5612 kB of archives.
After this operation, 19.0 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu/trusty/main libgeopip1 amd64 1.6.0-1 [71.8 kB]
```



**Compute Platform**  
On-Prem or Cloud



**User "Console"**  
In any Browser



**Axia Altus**  
Software Container



# Where to **Deploy Axia Altus**?



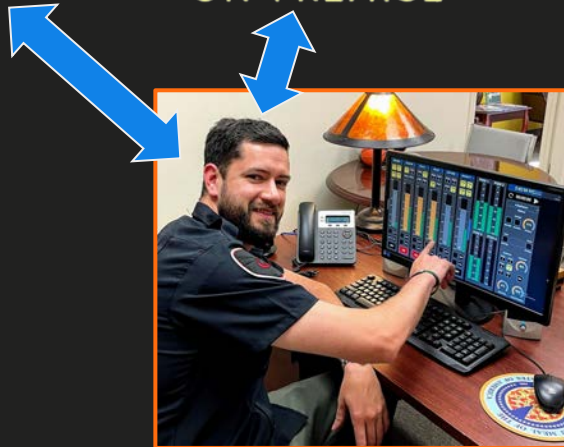
CLOUD



ON-PREMISE

**Axia Altus may be installed...**

- On-Premises using customer's qualified hardware.
- On-Premises using Telos Alliance hardware
- Private Data Center or AWS Cloud



# REAL CONTAINER USERS, REAL STORIES





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# The Story of Our Homelessness



Jeff McGinley

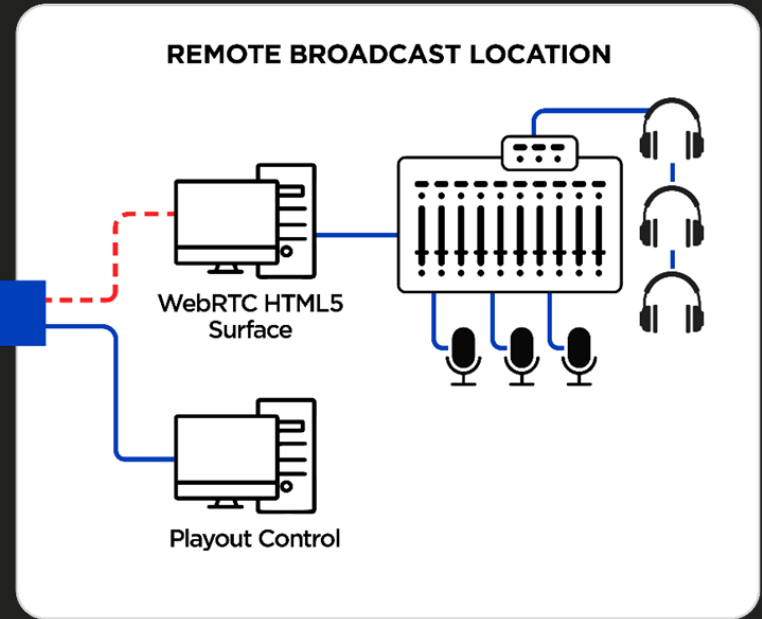
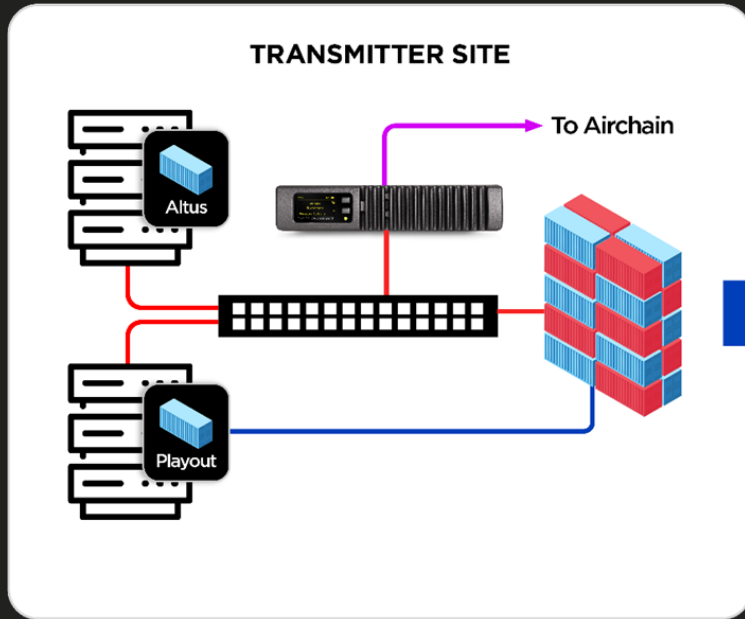


# Centralized Ops / Dispersed Talent



Jeff McGinley





- Quick build & deployment was critical
- Hosted at the transmitter site - great Internet there
- Local audio mixing and monitoring in local analog hardware
- A model for future projects in cost savings?



# Remote Access Security



Jeff McGinley





# Morning Team **SPLITS UP**



Jeff Kingman



Jeremy West



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# Altus is a **GREAT CONSOLE!**



Jeremy West



# Right at Home, Altus is a **GREAT CONSOLE!**



Jeremy' Axia Altus





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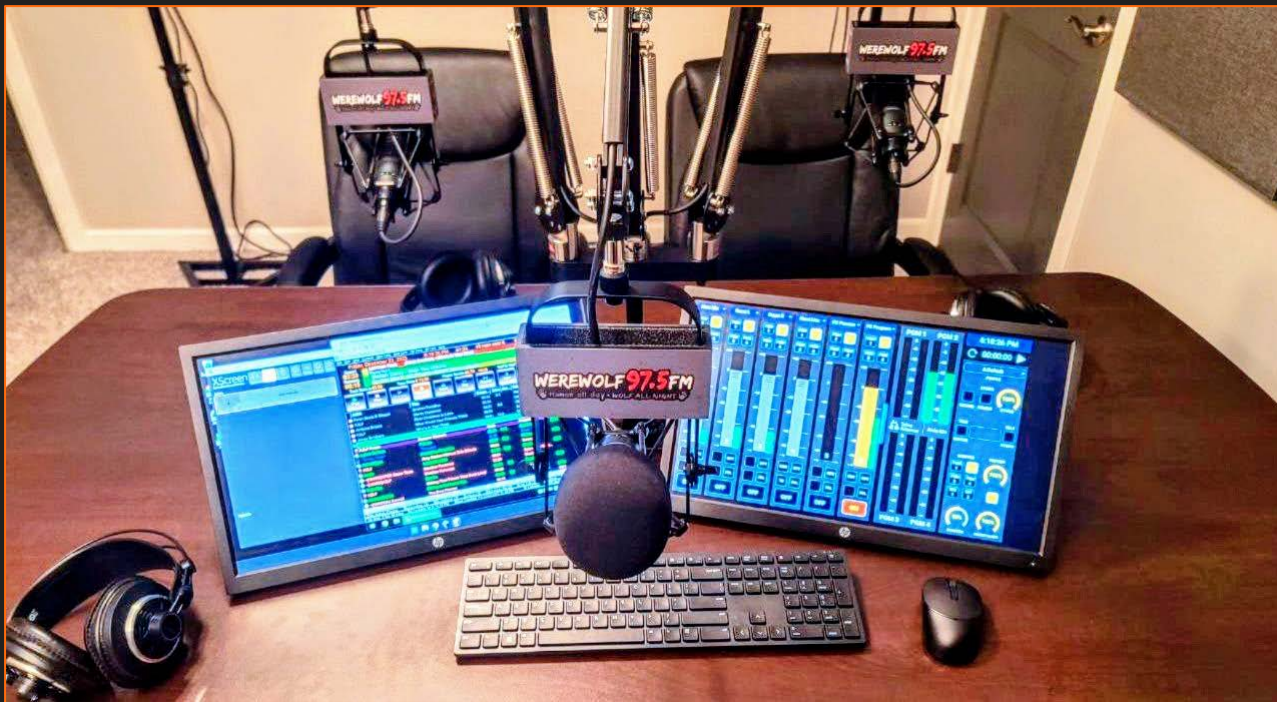
# How We Use **CONTAINERIZED SOFTWARE**



Thane Conriocht



# How We Use **CONTAINERIZED SOFTWARE**



KZLF-FM - Werewolf 97.5



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# Virtualization Makes **BETTER RADIO**



Thane Conriocht



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# Small Broadcasters Get **BIG BENEFITS**



Thane Conriocht





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# Boomers & TOUCHSCREENS



Jeff McGinley



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# IP is the Most Versatile Tool ever adopted in Broadcasting



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# Modern-Day Scenario:

New FM-HD1+HD2+HD3

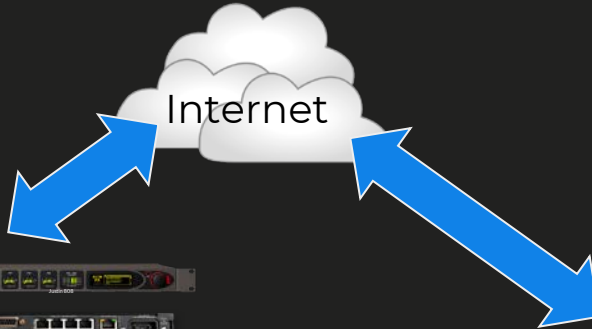
Mostly Automated

Live-Local Morning Show

No Line-of-Sight

Excellent Fiber Internet





- PayoutONE Server
- PayoutONE FM/HD1
- PayoutONE HD2

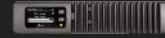
- PayoutONE HD3
- FM, HD Stream Processing / Streaming
- Ingest

- Nautel Multicast+ Imp/Exp
- Axia Altus / Telos VXs
- Spare

- FM Analog via  $\mu$ MPX
- HD1, HD2, HD3 via Nautel E2X







- PlayoutONE Server
- PlayoutONE FM/HD1
- PlayoutONE HD2

- PlayoutONE HD3
- HD Stream Processing / Streaming
- Ingest

- Axia Altus / Telos VXs
- Spare

- Nautel Multicast+ Imp/Exp
- Spare



Telos Alliance®



Internet



- Nautel Multicast+ Imp/Exp
- Axia Altus / Telos VXs
- Spare



- PlayoutONE Server
- PlayoutONE FM/HD1
- PlayoutONE HD2

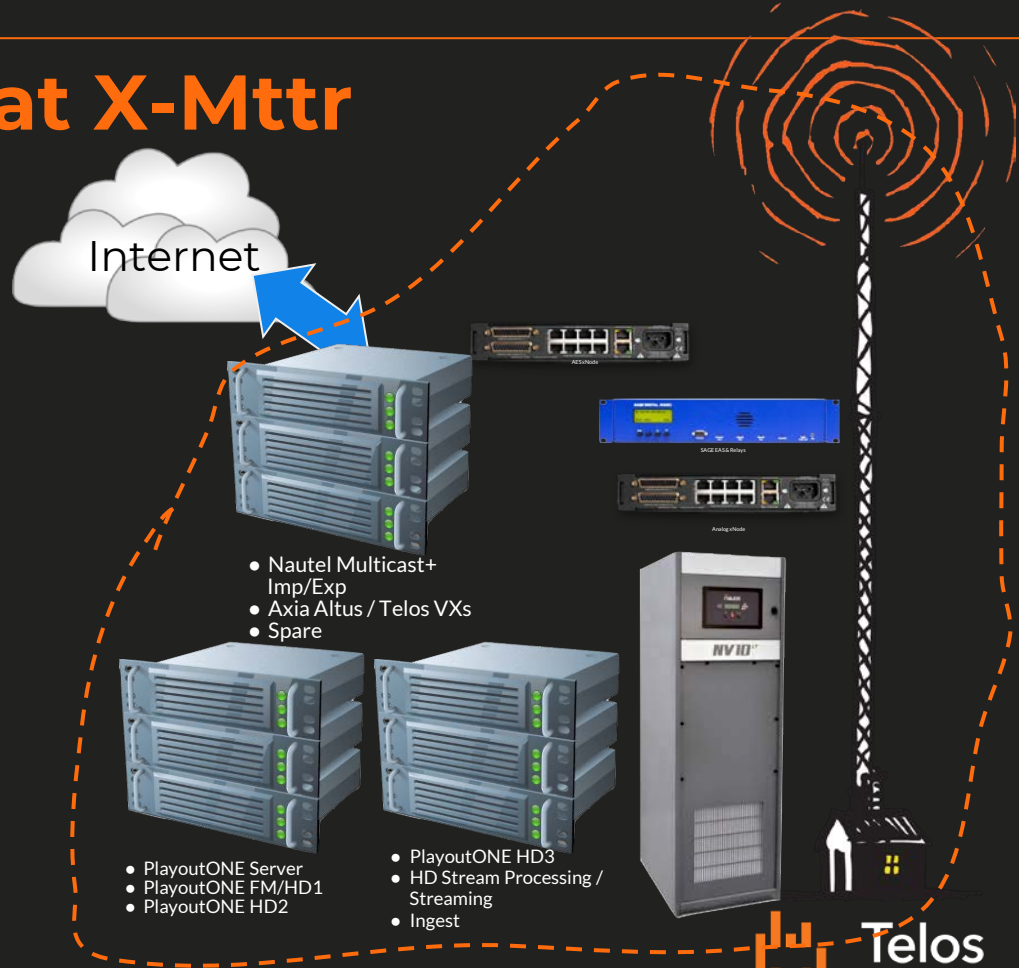


- PlayoutONE HD3
- HD Stream Processing / Streaming
- Ingest



# WBZK-FM All Eqt at X-Mttr

- Automation Systems
- Audio Mixing Console
- On-Air Phone System
- Audio Processing
- HD Exporter/Importer
- HD FM Exciter/X-Mttr
- Stream Encoding



# Virtualized Operation for **THE BUZZ**



WBZK-FM/HD Virtual  
Main Studio



WBZK-FM/HD Altus  
Console, & VXs Phones





# Single Talent Remote - Easy



- Remote Host Working Alone
- Easy - just like a remote CODEC feed
- 1 Contribution feed
- 1 Mix-Minus feed



- Nautel Multicast+ Imp/Exp
- Axia Altus / Telos VXs
- Spare



- PlayoutONE Server
- PlayoutONE FM/HD1
- PlayoutONE HD2



- PlayoutONE HD3
- HD Stream Processing / Streaming
- Ingest



# WBZK-FM Everything at the X-Mttr



Analog xNode EAS  
Loop-Thru

Axia Altus  
Telos VXs  
WebRTC

The Buzz  
Automation

Oldies  
Automation

The Beat  
Automation



HD2, HD3,  
Stream Proc

AES xNode



Nautel HDFM  
Exciter

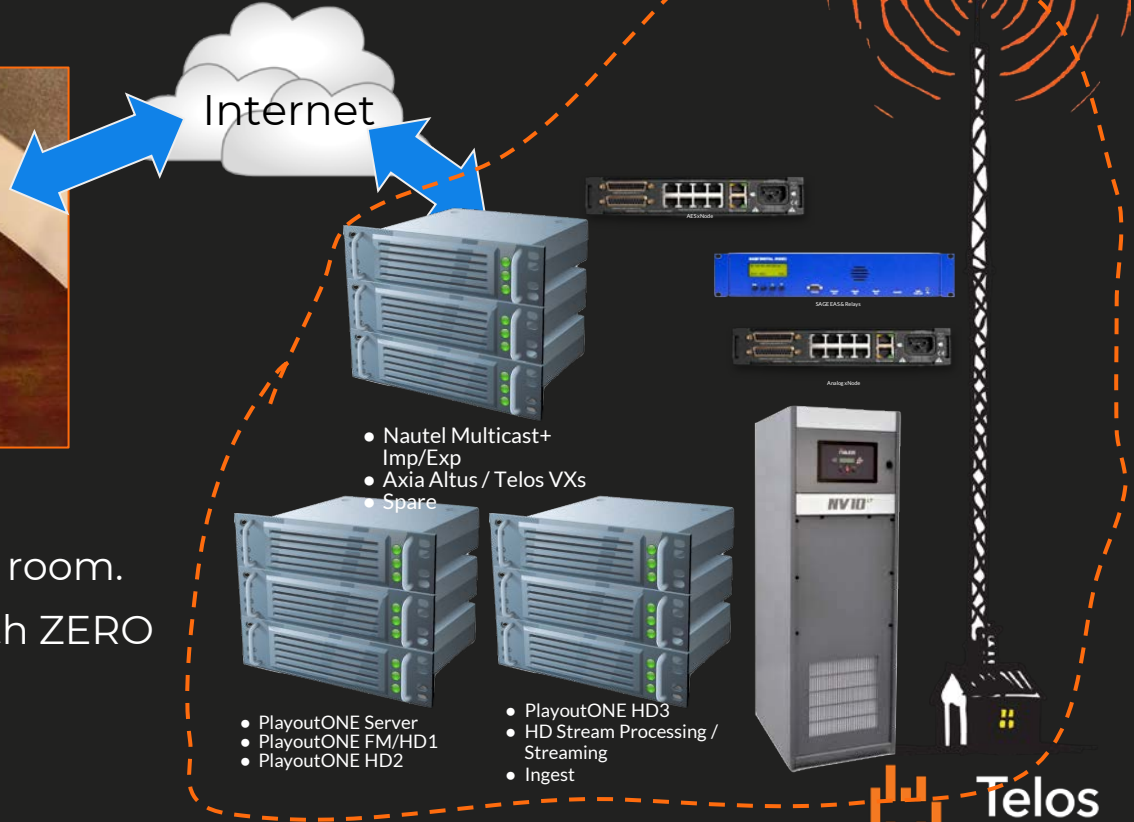
Nautel VS 2.5  
Amplifier



# Multi-Talent Remote - **Complication!**



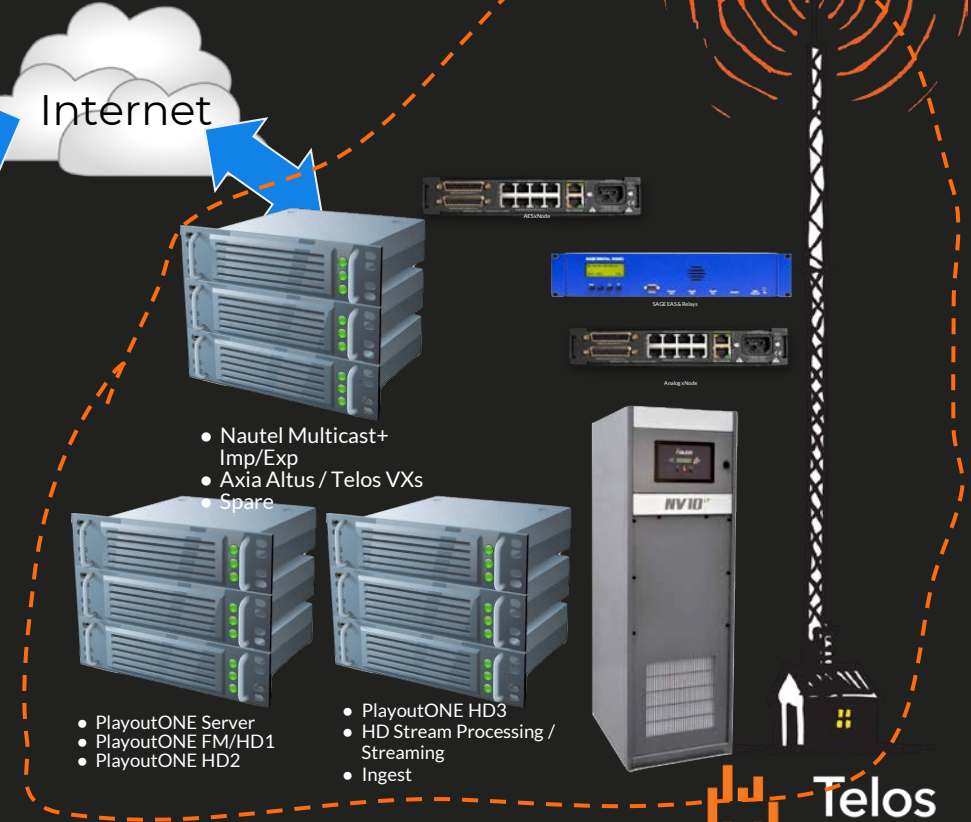
- Complication!
- Several mics in the same room.
- Must hear each other with ZERO delay (or close)



# Multi-Talent - Local Mic Mix



- Requires local mic mix
- Send mix of mic (& other local audio) to remote (main) mixer



Internet

- Nautel Multicast+ Imp/Exp
- Axia Altus / Telos VXs
- Spare

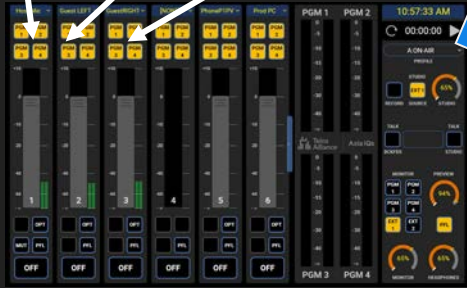
- PlayoutONE Server
- PlayoutONE FM/HD1
- PlayoutONE HD2

- PlayoutONE HD3
- HD Stream Processing / Streaming
- Ingest





# Multi-Talent - Headphone Mix



- Nautel Multicast+ Imp/Exp
- Axia Altus / Telos VXs
- Spare



- PlayoutONE Server
- PlayoutONE FM/HD1
- PlayoutONE HD2



- PlayoutONE HD3
- HD Stream Processing / Streaming
- Ingest



- Headphone Mix for Local Talent
- Mix of local mics PLUS Mix-Minus from the remote (main) Mixer



# Main Studio Remote Audio Connections



# Main Studio Monitor Routing

**Axia IQs** LU Meter ▲

**iQs (iQs-OMG) Control Center**

Logout  
System  
Status  
Setup  
License Management  
Customize  
Log  
Log History  
Log Setup  
Backup / Restore  
Synchronization  
Console Control  
Surface  
Profile Manager  
Sources  
Shows  
Changes  
IO Manager  
Outputs  
V-Mixer & V-Mode  
Stream Status

**V-Mixer:**

#	Control Type	Logic Port	Gain
V-Mix Master	Disabled	0	+0.0 dB

#	Source	Status	On	Gain
In 1	Altus L PC	Ok	<input checked="" type="checkbox"/>	+0.0 dB
In 2	Prod PGM1	Ok	<input checked="" type="checkbox"/>	+0.0 dB
In 3	--- no source ---	Idle	<input type="checkbox"/>	+0.0 dB
In 4	--- no source ---	Idle	<input type="checkbox"/>	+0.0 dB
In 5	--- no source ---	Idle	<input type="checkbox"/>	+0.0 dB

Apply

**V-Mode:**

Input: None

Mode: Pass Stereo

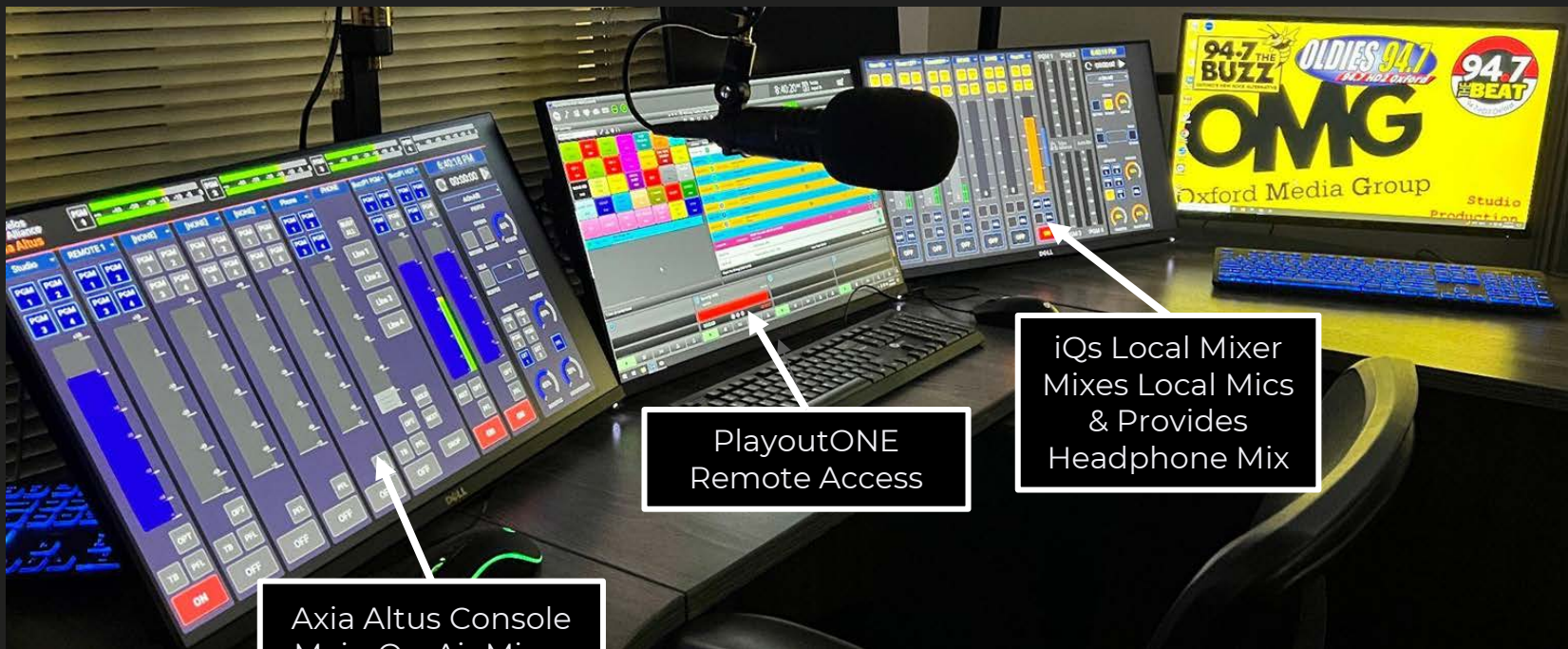
Apply

Host Mic Guest LEFT Guest RIGHT [NONE] PhonePTPV Prod PC PGM 1 PGM 2 PGM 3 PGM 4

10:57:48 AM  
00:00:00  
A ON-AIR  
STUDIO 65%  
TALK CR DIMMED TALK  
MONITOR PREVIEW  
PGM 1 PGM 2 94%  
PGM 3 PGM 4  
EXT 1 EXT 2 PFL  
65% 65%  
MONITOR HEADPHONES



# WBZK-FM Control Room



Axia Altus Console  
Main On-Air Mixer  
Remote Access

PlayoutONE  
Remote Access

iQs Local Mixer  
Mixes Local Mics  
& Provides  
Headphone Mix





# Clean Digital Audio for **THE BUZZ**



Chris Green



# WBZK-FM Control Room



# Axia Altus



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# Timely Tips

- **Remote Access..**
  - **DWService.net**
- **SIP Telephony**
  - **ClearlyIP.com**
    - **FreePBX**
- **“VPN Killer” - Secure Tunnel**
  - **Avoids Mistake-Prone VPNs**





# Learn About **Software Containers**



**CONTAINER  
UNIVERSITY**



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# Mom Wants a **Picture**, please...

Text: 615 423-0053

E-mail: [kirk@harnack.com](mailto:kirk@harnack.com)





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LOVE WHAT YOU HEAR