



Reinventing Intercom with SMPTE ST2110-30

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A Short History Lesson



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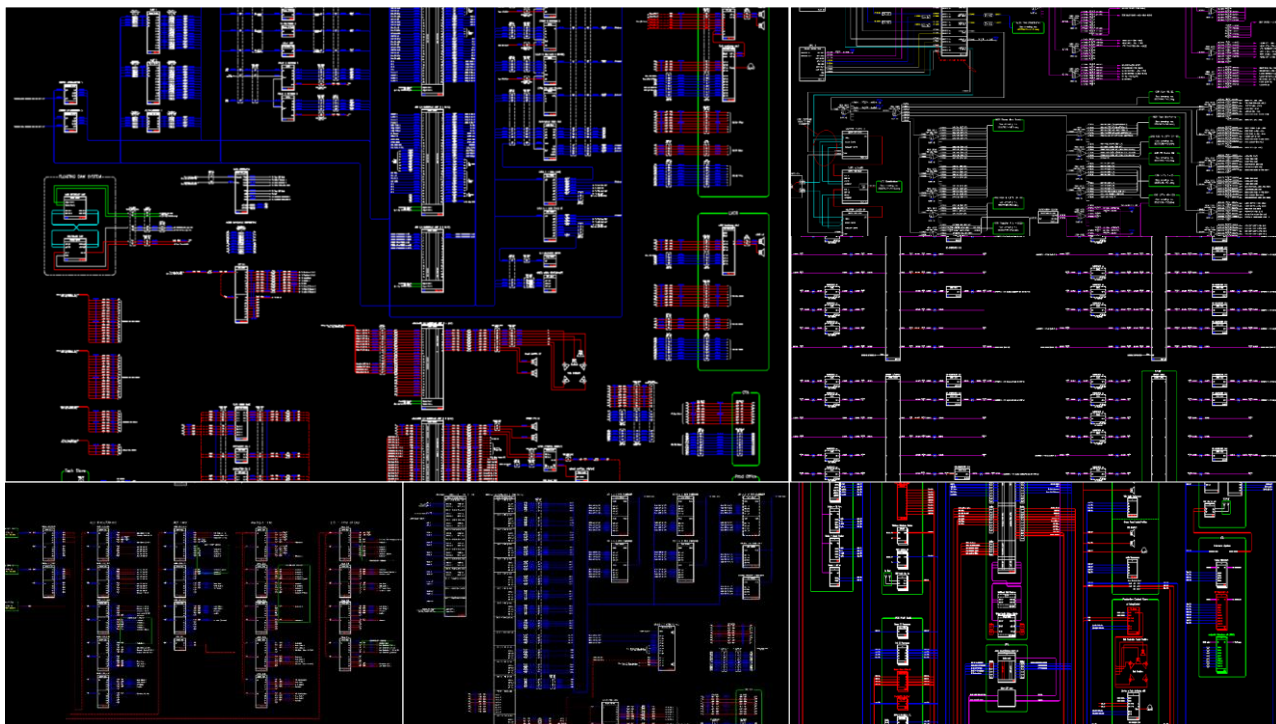
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Typical broadcast system install: 2003/4

- RTP in Lisbon, new HQ went live April 2004 in time for Euro Soccer Championships
- AES-3, Analog and SDI audio throughout
- In excess of 10,000 individual audio pairs.
- Everything through patch bays
- Hundreds of miles of cable
- Tens of thousands of hand soldered, crimped or punched connections





Audio over IP: A Revolution 2003 to Present Day

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2003: The Telos Alliance (Axia) Introduces Livewire, The First AoIP Protocol

2004: First AoIP Broadcast Studio Created: Auburn University's WEGL-FM 91.1 in Alabama

2006: Audinate Introduces Dante IP Audio Protocol into Pro AV Market

2008: Wheatstone WheatNet AoIP Protocol Comes to Market

2010: ALC Networks Introduces Ravenna

2010: The Audio Engineering Society Forms the x192 Working Group

2013: The AES67 Standard Is Ratified

2014: Media Networking Alliance Launches

2015: Alliance for IP Media Solutions Formed

2017: SMPTE publishes SMPTE ST 2110, adapting AES67 as the audio format 2110-30

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Audio over IP: The Payoff

- Standards Based – AoIP uses Layer 3 switch fabric, PTP Clock, RTP and SDP
- Switched Multicast removes the need for DAs, Patch Bays, Centralised Routers
- Reduces cabling, saves rack space, less complex design and associated costs
- Uncompromised audio quality - 24bit/48Khz low latency
- Digitized signal path at source
- No complex House-Sync distribution system
- Distributed Architecture = Fewer single points of failure

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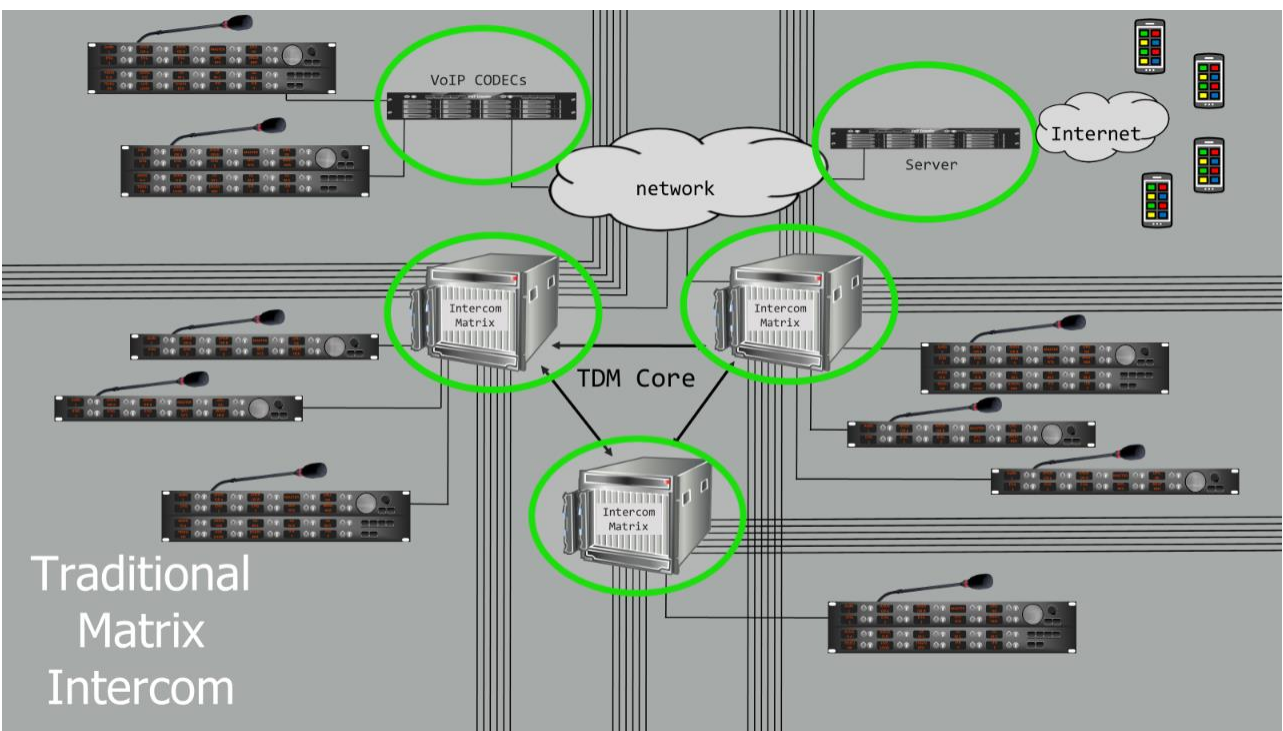


INTERCOM LIFE AS WE KNOW IT TODAY

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Traditional
Matrix
Intercom



Matrix Intercom, a practical solution?

- Crosspoint Switching
- Partylines, IFBs and Groups all require mixing
- Matrices can store configurations
- Gain controllable I/O and crosspoints
- Signal detection and monitoring is easy
- Matrices are resilient – Dual Power/Dual CPU
- Wide range of connectivity options
- A known commodity

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When Matrix Intercom is not such a practical solution

- Lack of flexibility – size limited by port count
- Channel handling limited by buss structure
- Difficult (and expensive) to trunk multiple frames
- Takes up rack space
- Everything cables back to central point
- AoIP connected devices also need Ethernet fabric
- Single points of failure

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THE CHALLENGE: BUILD A MATRIX-LESS PURE IP INTERCOM

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A Pure IP Intercom From Scratch: Design Rules

- Distributed DSP: No Matrix or equivalent Central Processing Engine
- Produce 'Familiar' Software and Hardware components
- Meet or exceed expected Matrix Intercom capability
- Use standards based protocols natively – RTP / AES67 / SIP / VoIP
- A native part of a SMPTE ST2110 ecosystem
- Scalable and resilient solution
- Simple for users of all skill levels
- Hide complexity 'under-the-hood'
- Look beyond the limits of what has gone before

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Introducing: *Telos* INFINITY®

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Telos Infinity Intercom Overview

- All new system
- Standards based: Fully AES67 and S2110-30 compliant
- Matrix-Free distributed network architecture
- Fully featured hardware and software based system
- 'Infinitely' scalable
- Lower entry and maintained cost
- Seamless integration with VoIP via SIP codecs and Opus Server
- Erases the line between communication and contribution
- Plug and Play
- Modern and intuitive UI

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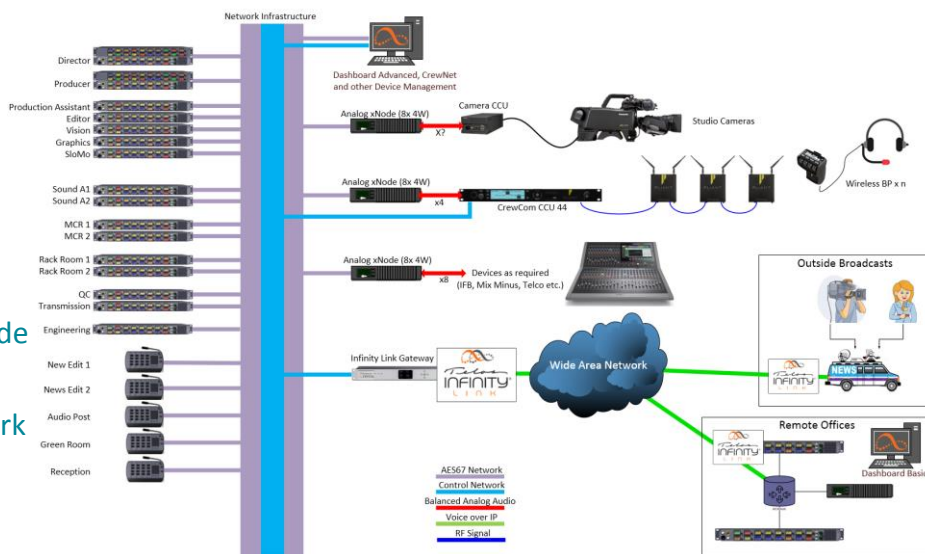
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Telos Infinity - Typical Studio System

Telos Infinity has no Matrix, so communication between Intercom elements is via direct connection to the LAN/VLAN/WAN

Analog and other baseband audio is converted to IP by node devices and any ST2110-30/AES67 present on the network can connect natively without an external interface



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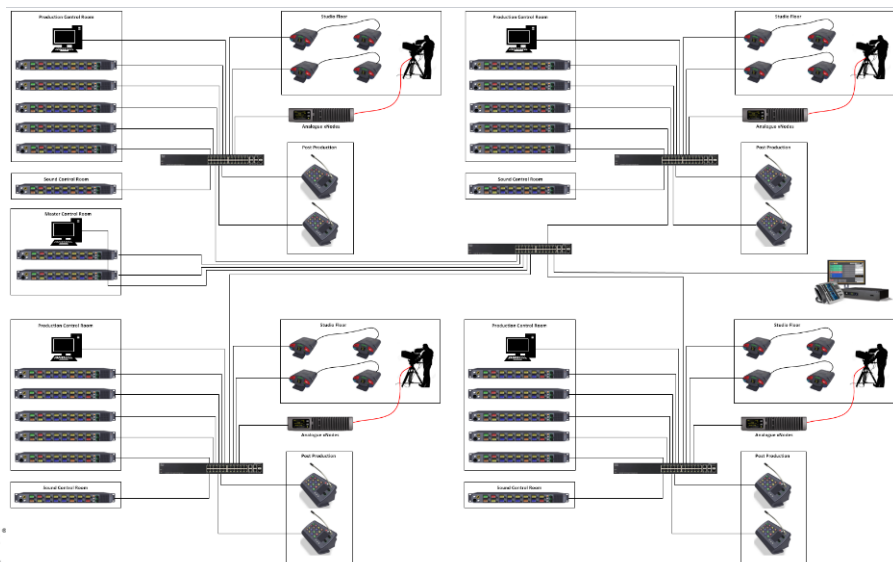
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Telos Infinity - Multi Studio System

Example shows four similar Production Studios and Master Control connected via a common IT infrastructure.

Dashboard Advanced enables the users to manage their own studio configurations while the Master Control client has full administrative rights over the entire system



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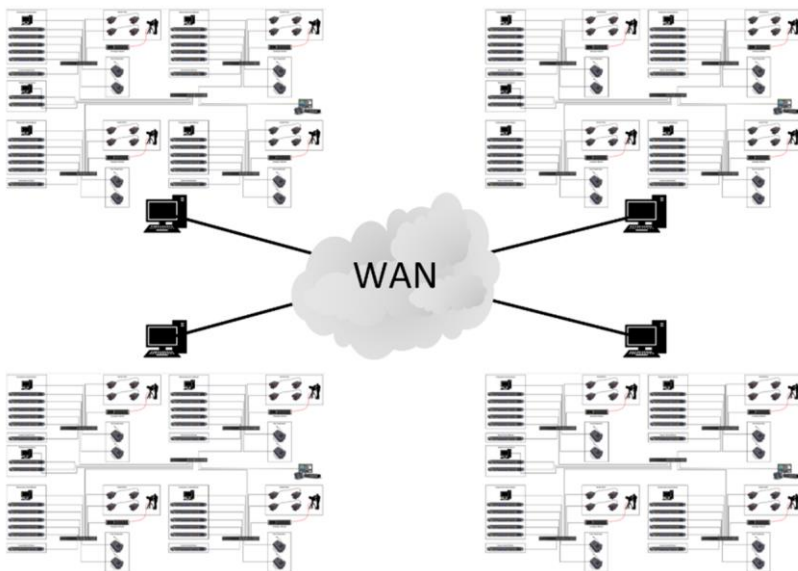


Telos Infinity - Multi Site Systems

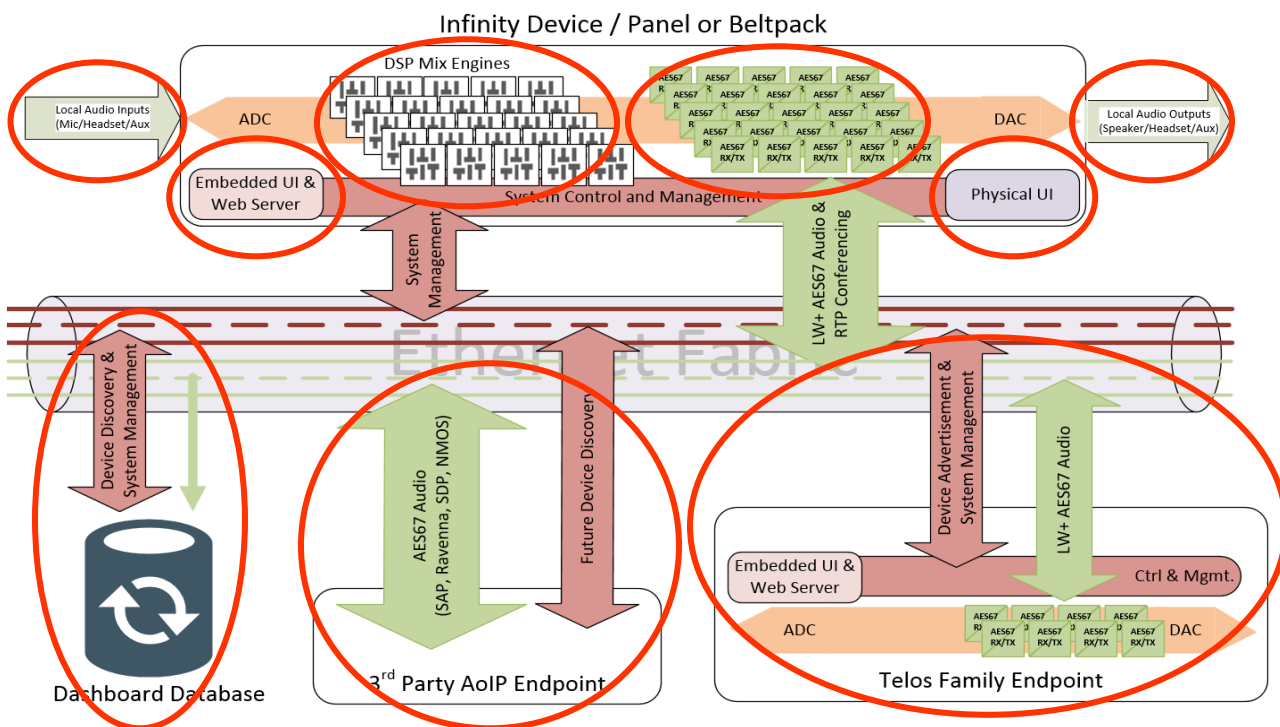
Sites are connected using Telos Infinity software servers equipped with the adaptive OPUS VoIP codec

Dashboard manages each local client with overall administrative control assigned to one or more Master Control operations

VLAN will work directly on hi-speed connections without needing VoIP compression



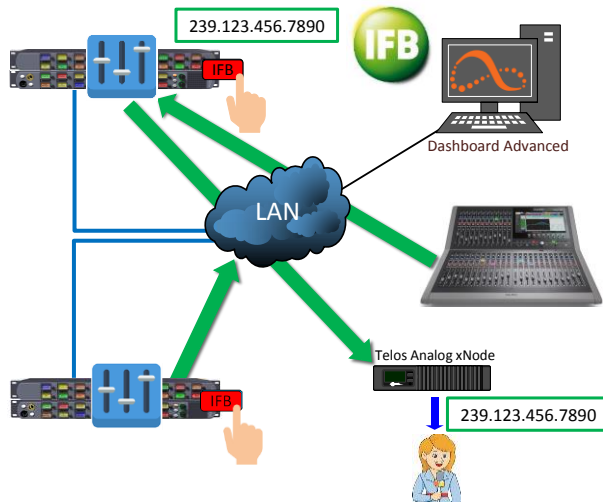
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Example: What happens when I create an IFB?

1. Create an IFB using Dashboard
2. Dashboard will assign a mix resource at two locations (primary and secondary)
3. Add a source (mix minus from console)
4. Add a destination (IFB Transmitter) IFB
5. Destination will subscribe to primary MC address
6. Mix Minus is routed to primary IFB mix
7. Destination hears mix minus
8. Add IFB key to Intercom panel(s)
9. Panels can talk across IFB feed – mixer will 'duck' mix minus per configuration



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Thank you

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