RAVENNA 2020 Webinar Series

(The “Remote” Sessions)

Lockdown Rock

Tue, Dec 01, 2020
15:00 h (CET)

Presenter: Luca Giaroli, DirectOut

DirectOut TECHNOLOGIES

ALC NetworX

Your Host

Andreas Hildebrand, RAVENNA Technology Evangelist

- more than 25 years in the professional audio / broadcasting industry
- graduate diploma in computer science
- R&D, project & product management experience
- member of AES67 TG and ST2110 DG

ALC NetworX GmbH, Munich / Germany

- established 2008
- R&D center
- developing & promoting RAVENNA
- Partnerships with > 40 manufacturers

RAVENNA

- IP media networking technology
- designed to meet requirements of professional audio / broadcasting applications
- open technology approach, license-free
- fully AES67-compliant (*built-in*)

Our Guest

Luca Giaroli, Product Manager, DirectOut GmbH

- Electronic and Software Engineer
- ProMusic, Sound Rental from 1990 to 2000 (Owner, Sound Engineer)
- Beijing Olympics Ceremonies 2008 (System Designer and Manager fibre network)
- Product manager for many companies in the audio industry (Optocore, Powersoft, Audiosales, Outline, DirectOut)
- Inventor and Mastermind of globcon

DirectOut GmbH, Mittweida/ Germany

- DirectOut specializes in developing essential pro audio connectivity, networking and bridging solutions for broadcast, studio, live and installed sound applications.
- The product range offers solutions that build bridges between systems based on different audio formats such as MADI, SoundGrid, Dante, RAVENNA and the standards AES67 and SMPTE ST 2110-30 / -31.

Today‘s Webinar:

- Lockdown Rock - the project
- Live examples
- Q&A

Let‘s go!

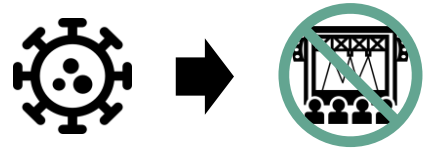
Check out the video at:
www.directout.eu/unternehmen/videos/ref-lockdown-rock

DirectOut ACADEMY

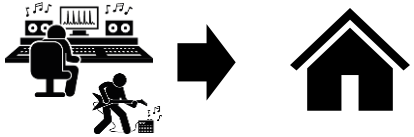
Lockdown Rock – The show must go WAN

Luca Giaroli,
DirectOut GmbH

The Situation



COVID-19 Pandemic forced production methods to change



Many people work from home, including artists, talents, hosts of shows etc.

Need for Remote Production increased drastically

Video Conference software uses heavy encoding/compression of audio and video

Almost everybody has a network connection at home.
How can we make use of that for uncompressed AoIP?

Scope

Standard Internet Connection (e.g. DSL)

No predictability

- in terms of latency,
- bandwidth &
- packet loss

results **will** vary !!

DirectOut's proven, JT-NM Tested RAVENNA implementation

! RAVENNA (AES67 / ST2110) was designed to work in managed or engineered networks

DirectOut devices offer many options to optimize the RAVENNA transmission

PRODIGY.MP can be remotely controlled and provides local (thus 0-latency) DSP and mixing capabilities on each location

DirectOut ACADEMY

White Paper –
AoIP over WAN with DirectOut Equipment

Definition of **Quality Levels A-D**

… to categorize the possible circumstances
… under which a production might use RAVENNA over WAN

Main Scenarios for PTP Synchronization & WAN connections

PTP Synchronization

PTP Grandmaster **with** GPS

- \+ phase accurate PTP sync in all locations
- \+ no transmission of PTP over WAN required
- − requires a GPS-synchronised Grandmaster device in each location

PTP Grandmaster **without** GPS

- \+ only one central Grandmaster device required
- \+ no Grandmaster device at the artist‘s place is necessary
- − PTP transmission over WAN required -> increased Jitter -> phase accuracy might suffer

WAN connections

Links **with** guaranteed and symmetrical bandwidth

- \+ offer reliable results in terms of latency, packet loss, etc.
- − rarely available in private home internet connections

Links **without** guaranteed and symmetrical bandwidth

- \+ available as a standard internet connection in most private homes
- − Unpredictable behavior in terms of latency, packet loss, etc.

Constraints & Prerequisites

! Using **public internet connections**, there are **no means to modify/configure the network** (switches, etc.) !

VPN

- required to put all devices in a virtual network
- needs to be powerful and well configured

! **Vivivaldy is a zero-config proven solution, successfully tested with DirectOut devices**

Packet drops

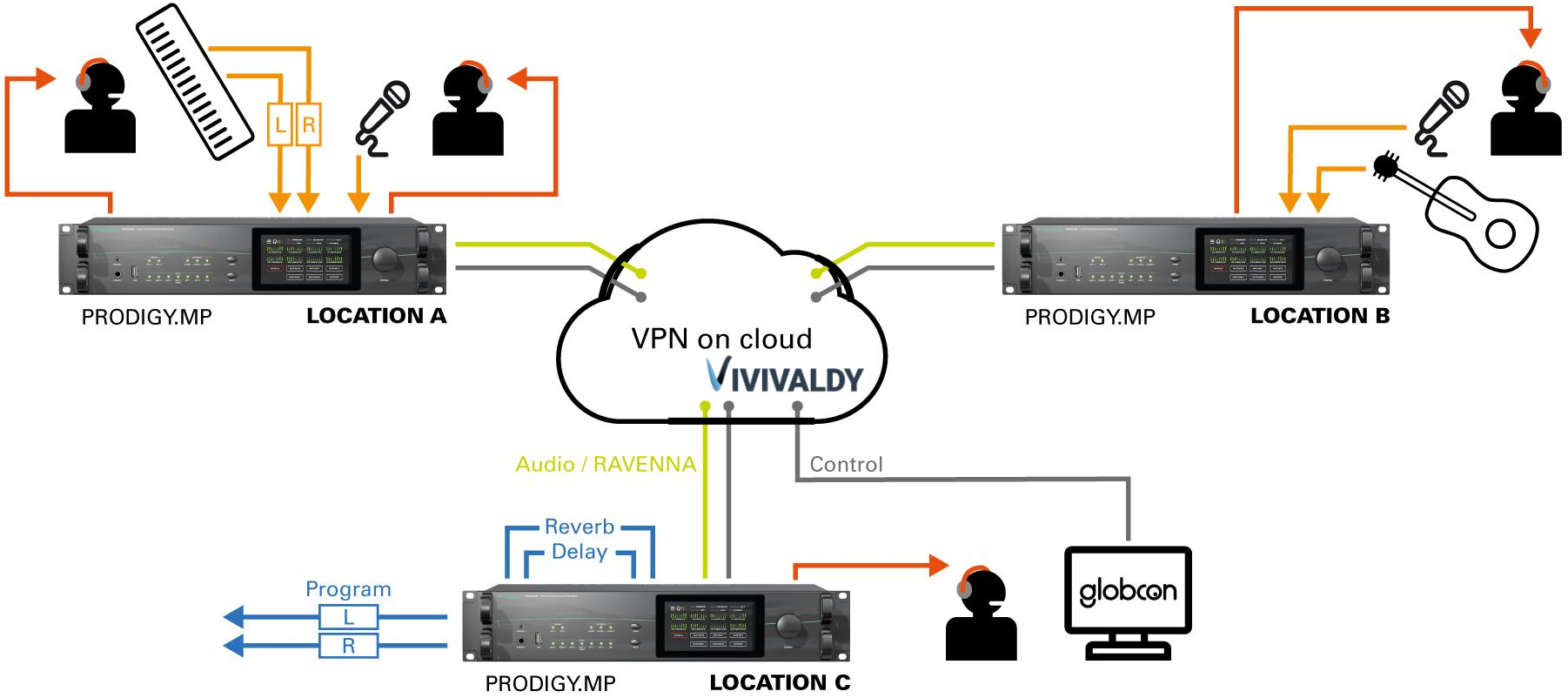
- Use stream redundancy (ST2022-7 for Multicast, Unicast Redundancy available on DirectOut devices)
- Vivivaldy grants Packet re-transmission, quick enough for broadcast (high buffer) streams

Packet jitter

- PTP: apply **Jitter filters** to reduce PTP jitter on the receiver → apply SRC if required
- Streaming: **Large input buffers** (several 100ms) are required to accommodate the packet jitter
  - → Large buffers increase stream delay
  - → use low-latency streams for monitoring only, where packet drops may be acceptable

If Multicast traffic cannot be used, **Unicast is required** for streaming and PTP distribution

The project | Lockdown Rock



70 km	Milan - Piacenza
90 km	Piacenza - Reggio E.
150 km	Reggio E. - Ravenna
360 km	Ravenna - Rome
570 km	Milan - Rome

Milan

Piacenza

Reggio E.

Ravenna

Rome

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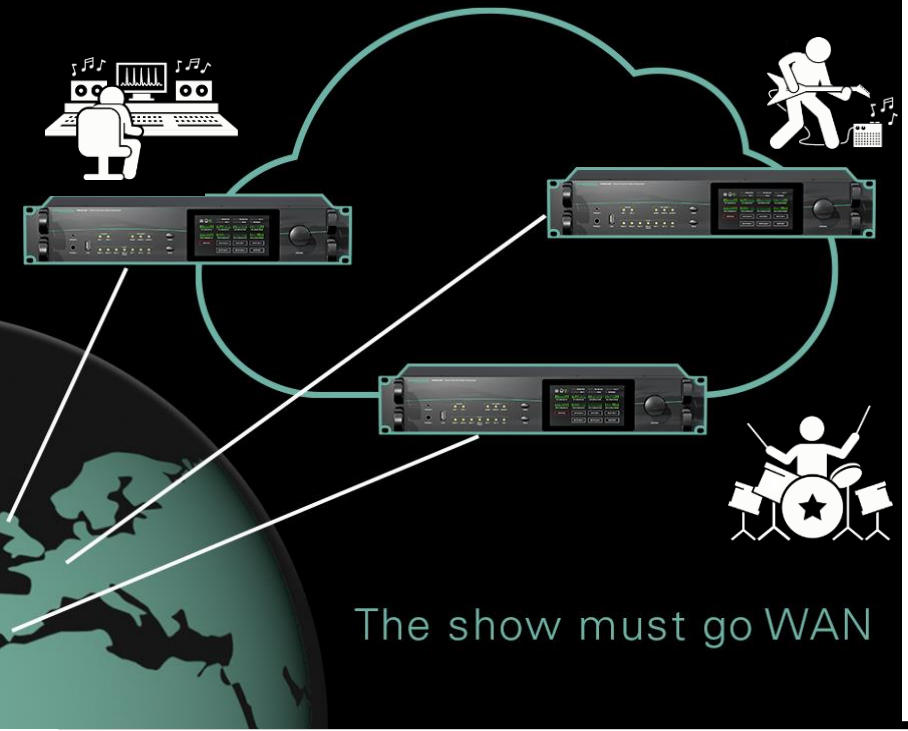
Results



Drawbacks and shortcomings of public Internet connections can be addressed with device configuration

- Jitter filters, stream buffers, redundant streams

Using public Internet should be considered a workaround

- Professional (and manageable) network infrastructure is preferable, but public internet connections could be the only way to go

Local 0-latency monitoring allows musicians to feel well when playing

- Mixing and configuration of local devices can be done by one or more engineers from remote positions

Measure and consider required speed and bandwidth beforehand

- E.g. achievable channel count depends directly on the available upload bandwidth, ping times varies on different internet connections/locations

GPS Grandmaster Sync preferred over PTP Transmission over WAN

Questions?

More answers...

RAVENNA / AES67 / SMPTE ST 2110 Resources:

www.ravenna-network.com/resources

DirectOut Academy:

academy.directout.eu

You've made it!

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RAVENNA
AES67 & ST 2110 built-in

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