



# TVU Networks

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**CAPTURE**

**PRODUCE**

**SHARE**

# About TVU Networks®

Global HQ in Silicon Valley

Over 2700 TV stations, Global top media companies in over 85 countries

Centralized European operations in Barcelona

Technical Support and Solutions Engineering

European focused solution Sales, Marketing and Logistics team

Local presence through strategic partnerships



# The Challenge for Media Companies

Produce more live video content

Deliver to different platforms faster and at a lower cost

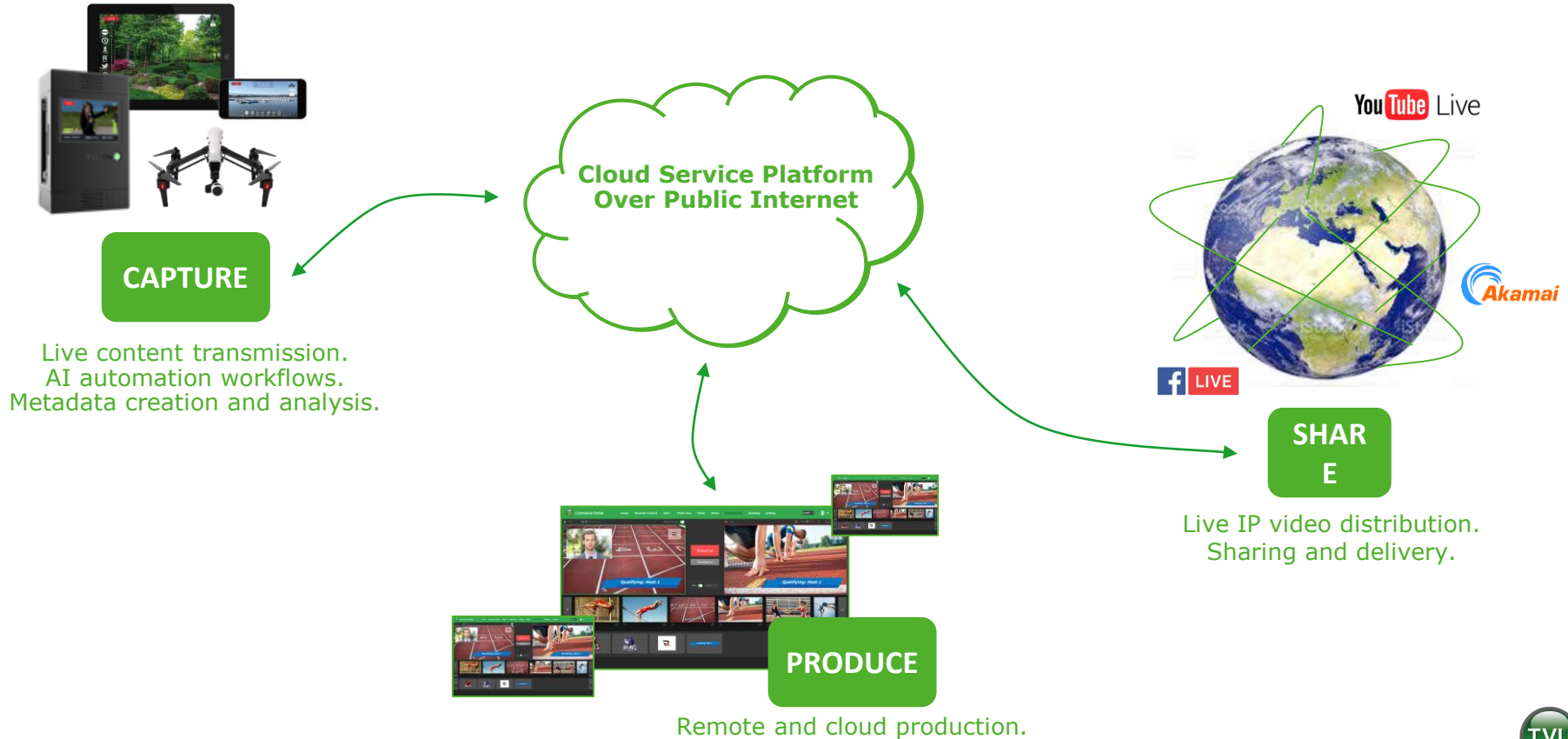
High mobility and scalability

Easy to use

Distribute to any device and any platform

# What are our solutions?

Workflow solutions to mass produce live video content for individual audiences at a fraction of its current cost.



TVU MediaMind®



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# Transmitters and Transceivers



## TVU One (v2, v3 and 4K)

- Simple, one-button, 40 second start time
- Inverse StatMux Plus , down to 3Mbps with 0.5s latency
- Fixed latency based on time-code (not drifting over time)
- Multiple IP connections: 4G/5G, Satellite, BGAN, WiFi, Ethernet
- Dual video encoders (VBR transmission + 7.5h of CBR SSD drive recording)
- Supports H264 and H.265 in the same transmitter
- Store & Forward and Progressive Download
- IP tunneling between pack and receiver
- Two-way VoIP, IFB and return video feed
- Build-in HotSpot and Router mode
- Time-Lock synchronization mode
- 1 Kg of weight, up to 4.5h battery
- 1080i, 1080p60, 4K/HDR
- Internal Battery and Low Power Consumption



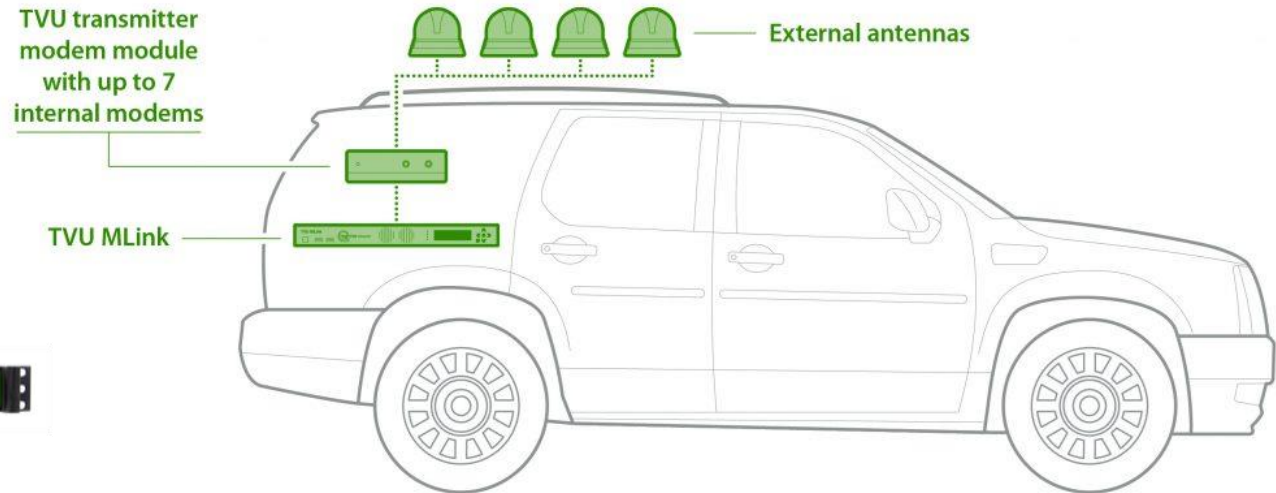


## TVU MediaMind Transceiver

- TimeLock synchronized transmission
- Web based control and integration to TVU Command Center
- Transmission recording option (QT H264 and XDcam50)
- Supports recording and cut editing based on timecode (NTP)
- Transmitter geo-location display map
- Decode and output external IP streams (RTO, RTSP, EDP, HTTP, ISS)
- Encode and output multiple IP streamings
- YouTube and FaceBook Live stream decoding
- Integrated workflow with Dalet, Primestream, CatDV
- SRT, NDI, SMPTE 2110 I/O
- Linux OS
- TVU Grid ready

## TVU MLink

- Fixed deployment in vehicles or in a studio.
- Aggregation of transmission signals from multiple mediums
- On Demand Video Retrieval, 12 hours continuous footage recording





## TVU Nano Video

- H264 and H265, sub-second latency
- Mini Dim SDI, Mini HDMI
- Two internal modems, 2 external
- Internal battery 90 minutes
- SIM, Ethernet and Wifi bonding
- 0.5 Kgs





## TVU Anywhere

- Fully compatible with iOS and Mac OS devices
- Works with TVU Transceiver and TVU Producer, QR Token activated
- Remotely Pan and zoom a HD window within the TVU live shot
- IFB and VoIP support, audio control
- Clip recording, clip playback and integrated PIP

## TVU Nano Router

- Ultra-compact and economical TVU Router platform
- Up to 100Mbps of data connectivity
- 3 embedded LTE modems, external antennas, Micro SIM cards
- Inverse Statmux + transmission technology Network Acceleration
- Internal, rechargeable 90 minutes run-time
- Built-in 802.11ac WiFi HotSpot for near-field use
- Ethernet LAN connectivity via USB to Ethernet adapter



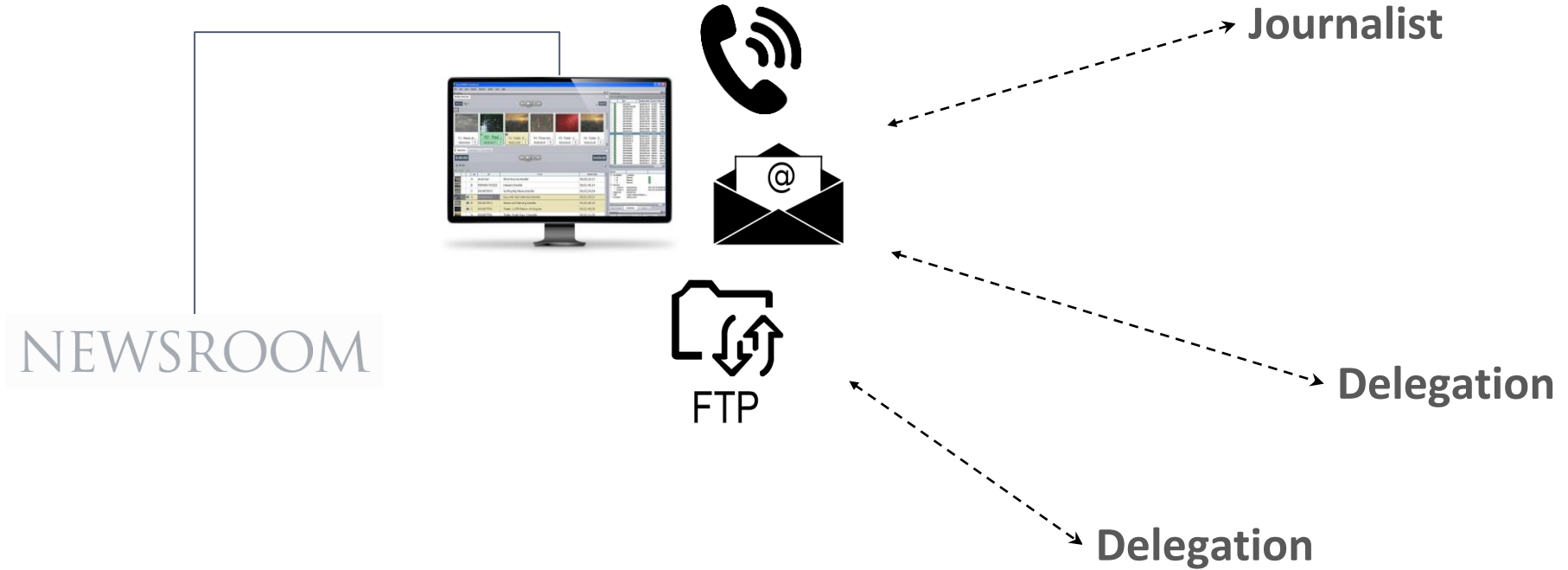
TVU MediaMind®



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# Contribution Automation & MediaMind Appliance





**Current workflows are manually processed and not automated**

Time is wasted + Metadata is not kept + Media is hard to search

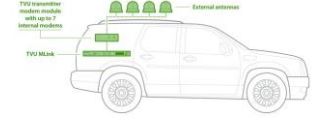


NEWSROOM



Story ID  
+  
Media ID's  
+  
Metadata

Event



News site

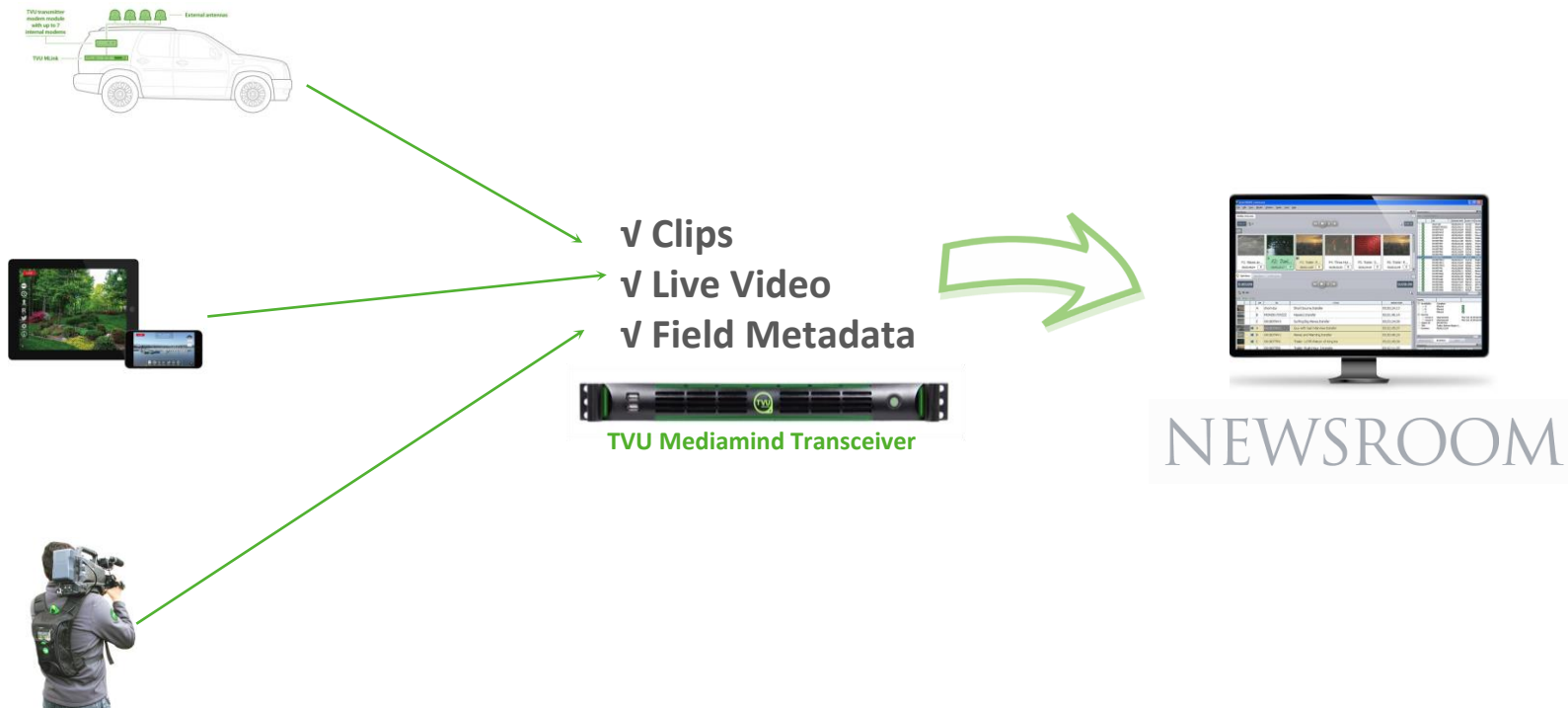


Event



**TVU CAS starts in the newsroom**

with a unique Story ID, media placeholders and integrated NRCS and MAM



**Metadata is added to the media in the field**

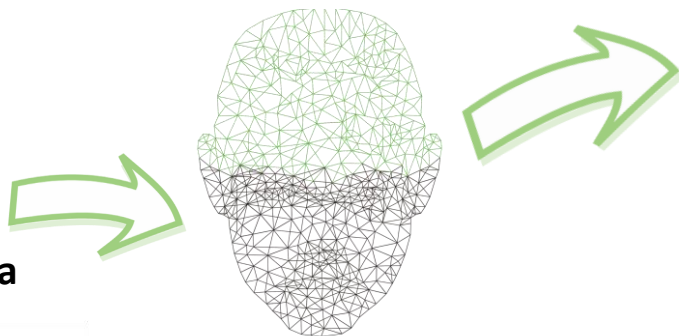
And transferred back to the station TVU Receiver



√ Clips  
√ Live Video  
√ Field Metadata



TVU Mediamind Transceiver

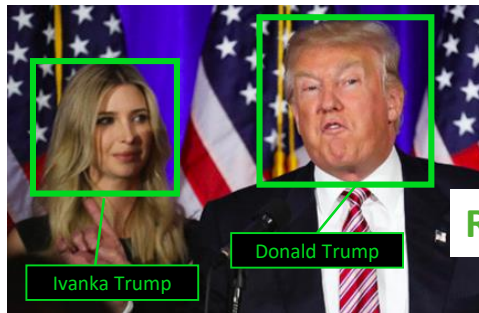


TVU Mediamind



Real-Time  
Transcription

One of the most hotly anticipated contests for British fans is tomorrow's cycling time trial. Less than a fortnight after becoming the first Briton to win the Tour de France...



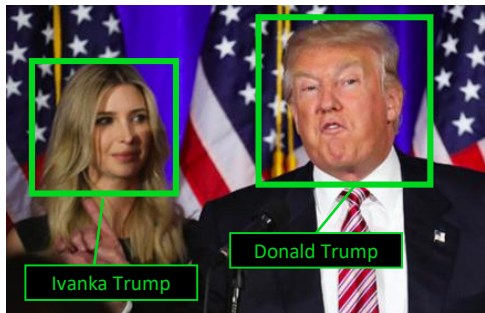
Real-Time Face Recognition

**Metadata is added to the media during ingest**

And transferred back to the station TVU Receiver



One of the most hotly anticipated contests for British fans is tomorrow's cycling time trial. Less than a fortnight after becoming the first Briton to win the Tour de France...



TVU Mediamind Transceiver

Story / MediaID



00:00:01:27

TVU Open  
API



NRCS/MAM

**Video file with XML sidecar transferred to MAM**

Content and rich metadata is now searchable down to the frame  
Media ID's placeholders are fulfilled within the Story ID



Trump Korea "is a really bad thing"



- ✓ Find content quicker
- ✓ Liberate resources through automation
- ✓ Avoid errors and manage complexity
- ✓ Receive suggestions of the available content
- ✓ Don't waste time and storage space



# TVU MediaMind Appliance

TVU MediaMind Appliance Manage Ingest

1 MMA\_Demo1

2

Type N/A Format 1080/59.94  
Bitrate 4096  
Geocode 34.000000 -118.000000

BREAKING NEWS  
WASH POST: NEW DETAILS ABOUT EFFORTS TO HIDE TRUMP'S SCHOOL GRADES  
CNN  
5:40 PM PT  
AC360

3

4

Story information

Name schedule test

Description

5

Facial detection

6

7

8

9

English (United States)

school records. Well wouldn't you know just a few days later the Headmaster at mr. Trump's own high school got an order from his boss to find Trump school records and helped bury them. It's new reporting tonight in the Washington Post in a moment. I'll speak with a reporter at the details first. Let's just point out that this all trash was something Michael Cohen said in testimony last week that the president was determined people not see his academic records. I am providing the committee today with several documents copies of letters. I wrote at mr. Trump's direction that threatened his high school colleges and the College Board not to release his grades or SAT scores tonight is Washington Post reporter Mark Fisher. We're can you just explain exactly how President Trump's High School records were buried.

Ingested list

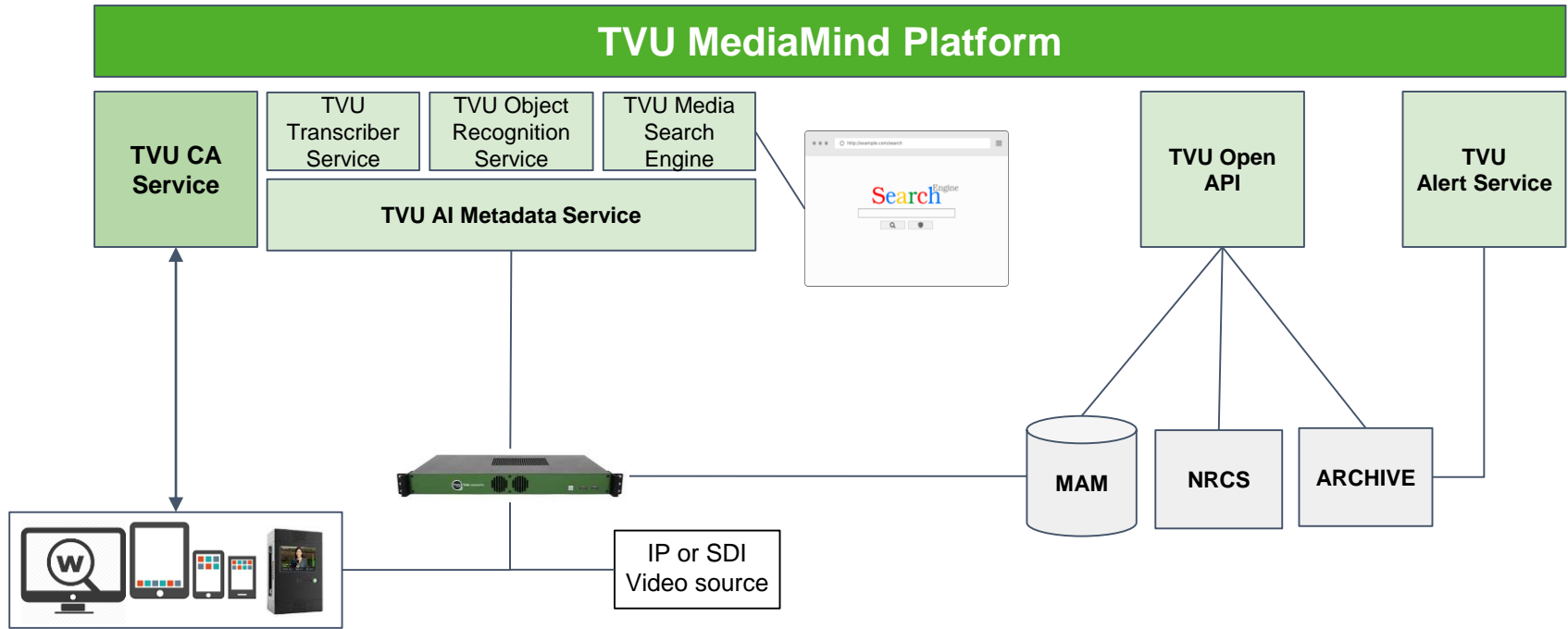
Asset name	Description	Receiver	Source	Author	Start time	Duration	Operation
* schedule test		MMA_Demo1	hide...	mmademo...	2019-03-13 10:58	-	stop
test for now		MMA_Demo2	Green Book	mmademo...	2019-03-13 10:10	-	
test backing		MMA_Demo1	hide	mmademo...	2019-03-13 08:31	0:09:43	



# ► Contribution Automation & Mediamind

- The backbone of CAS is the TVU API
- Multiple integrations with multiple partners
- Integration to our real-time search engine





## Contribution Automation and AI Metadata solution

- Powerful AI metadata workflow and live media search database
- Live News and Sports production Open API integrations



**MAKE**

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**Cost efficient,  
easy to use and scalable  
Remote Production Solutions**

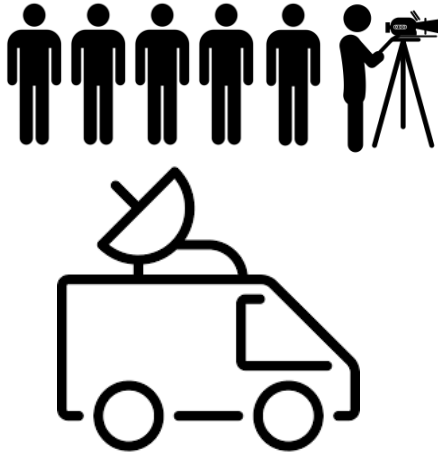


## TVU Live IP Video Production Solutions:

- TVU Time-Lock
- TVU RPS
- TVU Producer
- TVU Talkshow

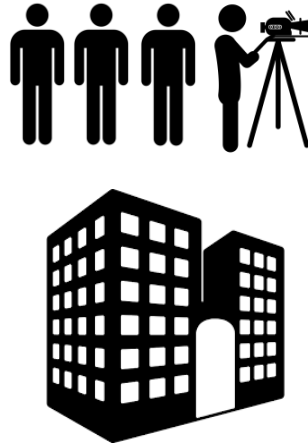
# Fast, Cost Effective, Scalable, Mobile and Shareable

Traditional



\$\$\$\$

Remote



\$\$

Cloud

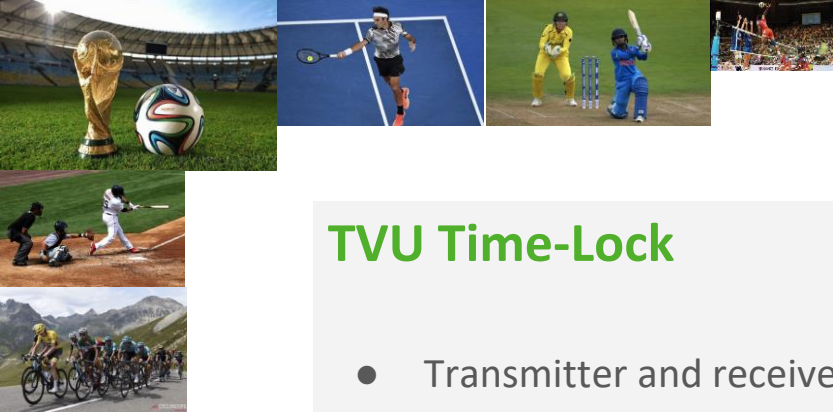


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**TVU TIMELOCK®**

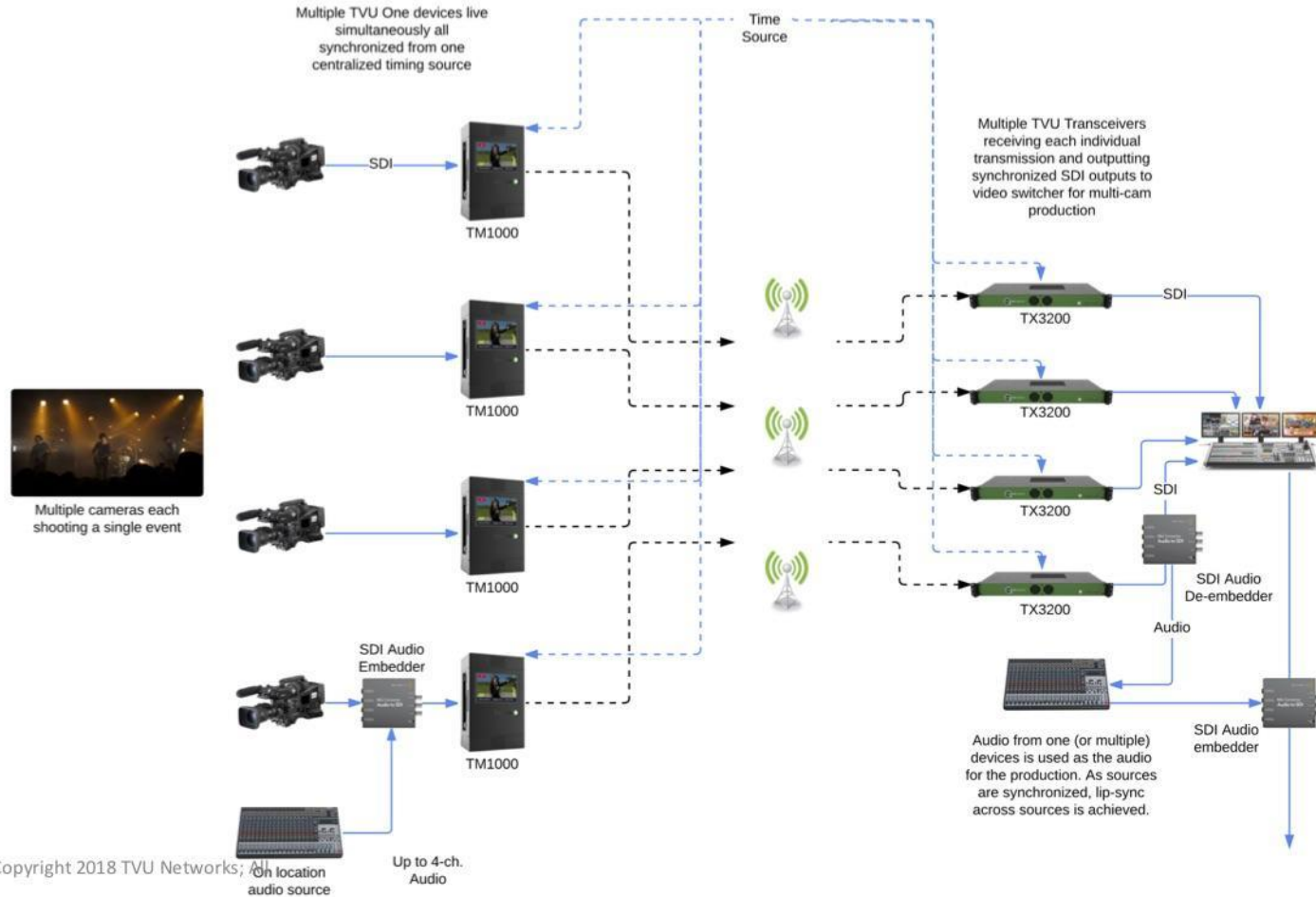


## TVU Time-Lock

- Transmitter and receiver time-coded synchronization
- Synchronizes 6 TVU transmitters to allow remote productions
- Less than 2 frames difference or 0 frames if cameras gen-locked
- TVU TimeLock is included as part of TVU6.1 Enterprise
- Supports IP Tunneling between transmitter and receiver
  - Control cameras, tally...

# Solution Diagram

TVU TimeLock





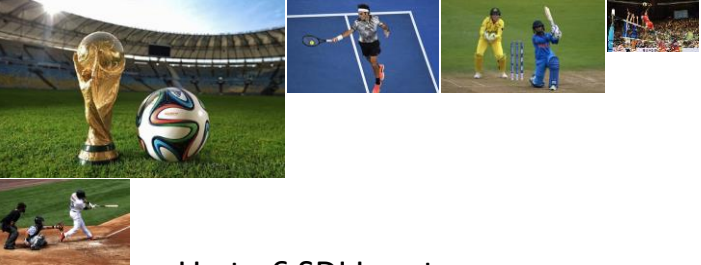
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**TVU RPS®**



**TVU RPS**

Professional frame-accurate solution  
for live remote production



Up to 6 SDI Inputs



6CH IP Video Encoder

Remote Site  
Ethernet

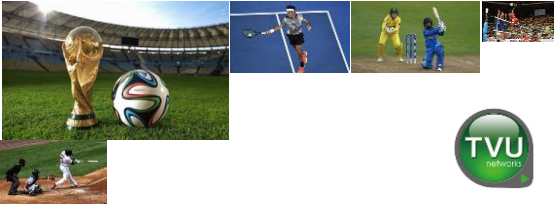


Local Site  
Ethernet

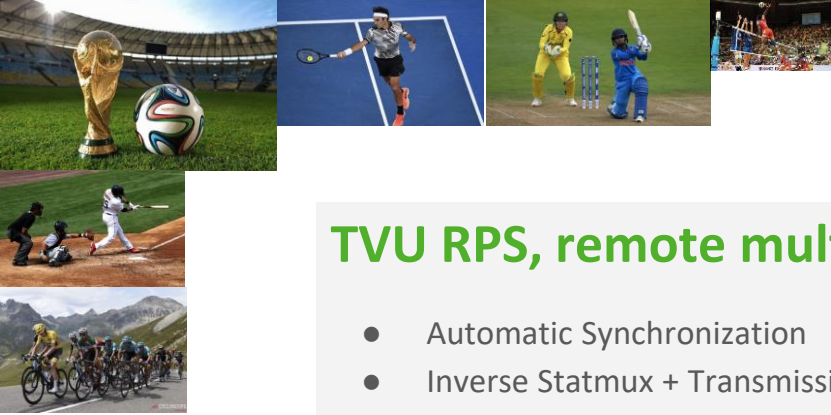
Up to 6 SDI Outputs



6CH IP Video Decoder



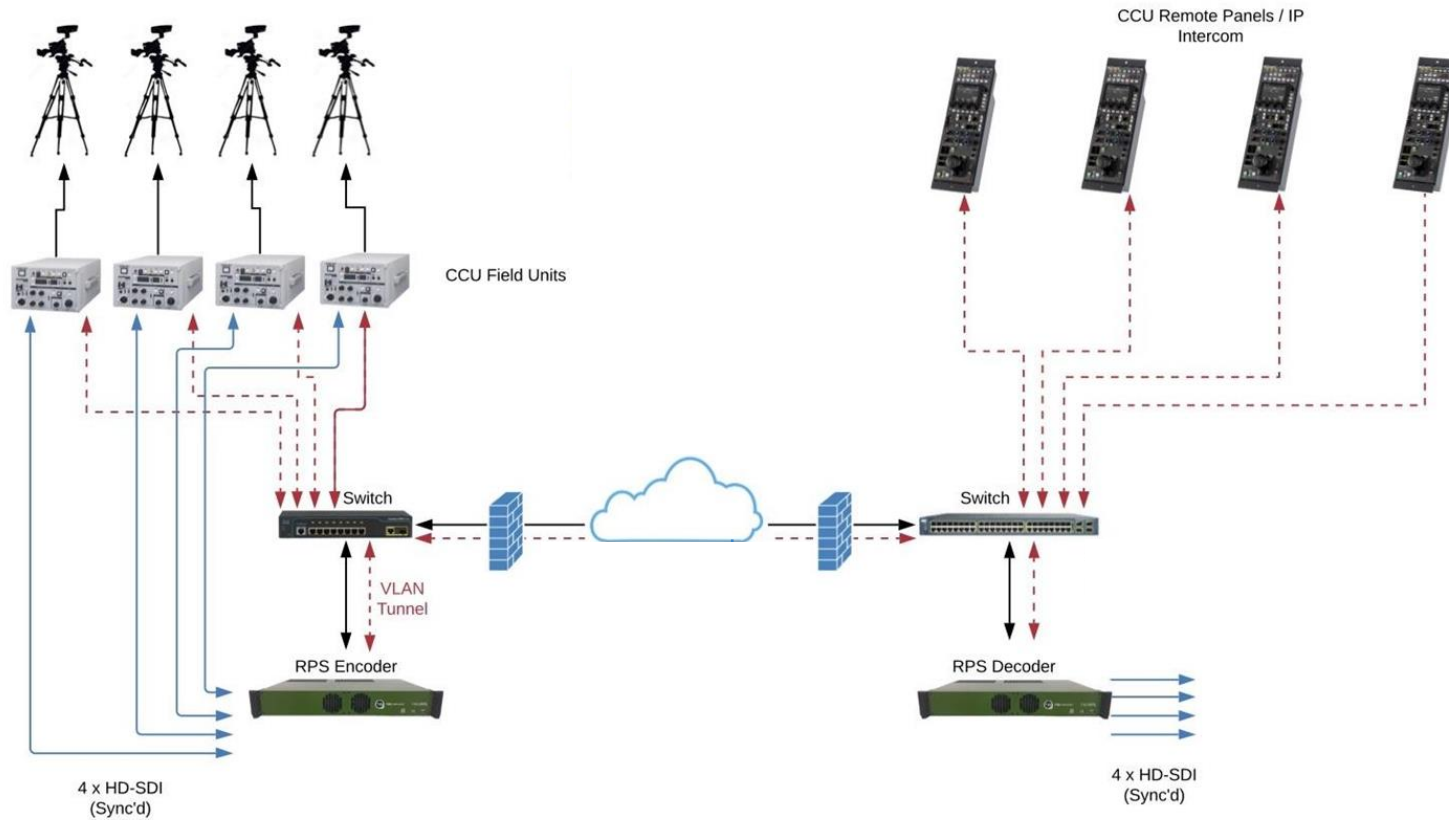




## TVU RPS, remote multi-cam live video production solution

- Automatic Synchronization
- Inverse Statmux + Transmission over Commodity Internet or Private Lines
- Up to 6 low latency channels
- Daisy-chain Multiple Systems for Additional Channels
- Configurable, Full Quality, Return Video Channels
- High Quality Encoding with Individual Bit-rate Control of all Channels
- Multiple Encode Behaviors: CBR, VBR and VBR with Channel Priority
- Up to 16 channels of audio per SDI input
- VLAN tunnel for IP-based accessory connectivity
- Simple configuration
- Fast Boot Time
- Web-based control, setup and monitoring interface
- Built-in encoder-to-decoder speed test
- Support for TVU TPC back-end (pairing)
- Duplex VoIP connection (encoder / decoder)

# TVU RPS for Remote Production Events (Technical Diagram)

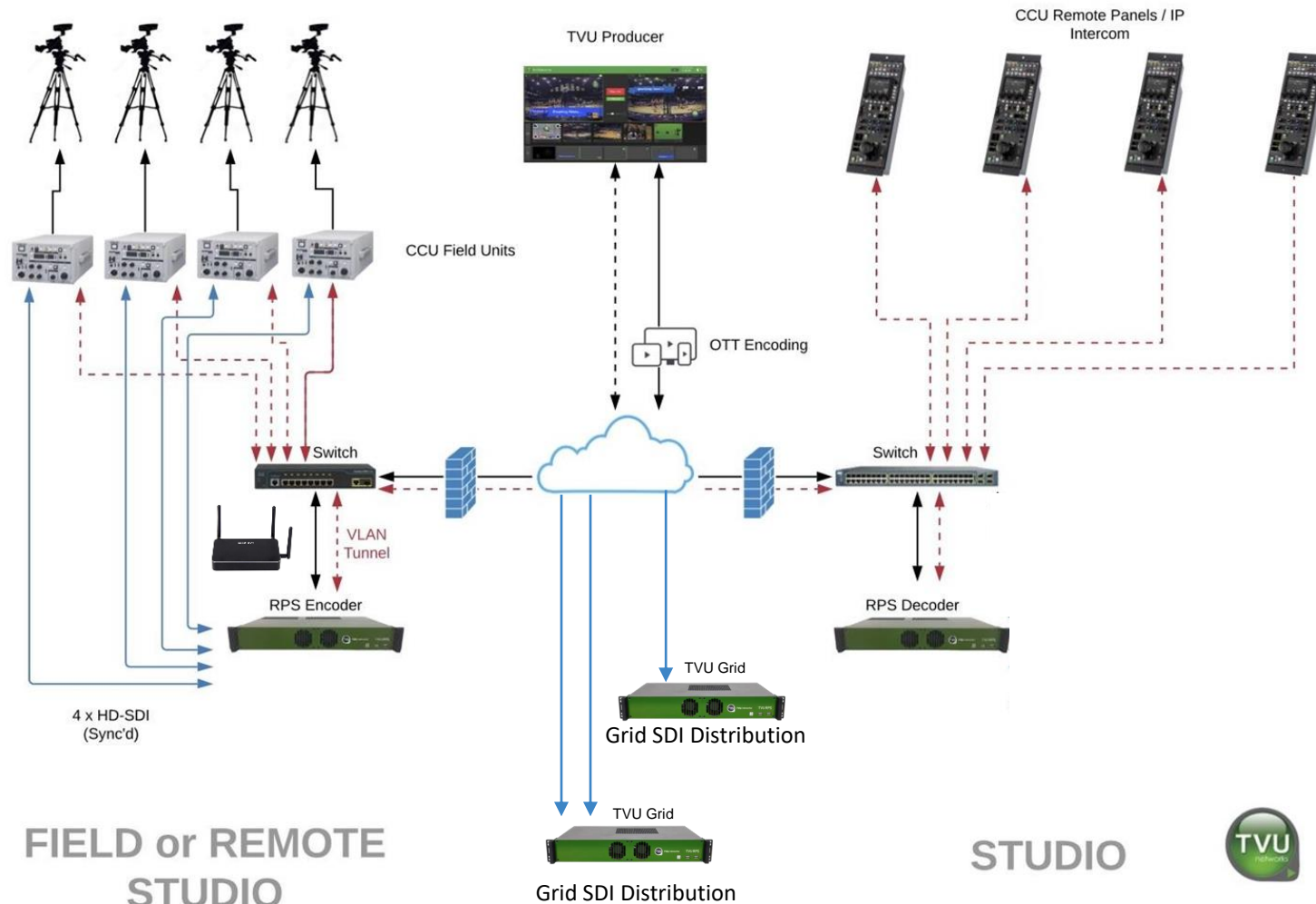


**FIELD or REMOTE  
STUDIO**

**STUDIO**



# TVU RPS + TVU Producer + TVU Grid for Remote Production Events (Technical Diagram)





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# TVU PRODUCER PRO®





Klara



A group of people are in a recording studio. In the foreground, a woman with short brown hair is speaking into a red microphone. Behind her, a man with glasses and a patterned shirt is also speaking into a microphone. To the right, a man in a dark shirt is holding a large sheet of paper and looking towards the others. The room has warm lighting and a large window in the background.

Chantal Pattyn  
Netmanager Klara

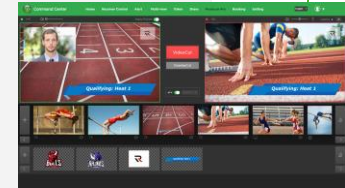
# Problems we solve

- ✓ Cost efficient transmission and production
- ✓ Ramp up time: nothing to install, only a few hours of training
- ✓ Pay for what you use, don't waste resources
- ✓ Scale as needed when needed
- ✓ High mobility, multi-operator or presenter, from any location



## TVU Producer

- Cloud based live production solution
- Switch up to 6 in-sync sources in real-time from a web browser
- Graphics, Picture-in-Picture, Video Replay and Slomo
- Multi-bitrate IP outputs to social platforms and CDN's
- Sources transmitted to Cloud based receivers
- Multi-operator user interface
- SDI output through TVU Receiver
- Browser-based channel audio control
- Two way talkback
- Clip recording on inputs and output

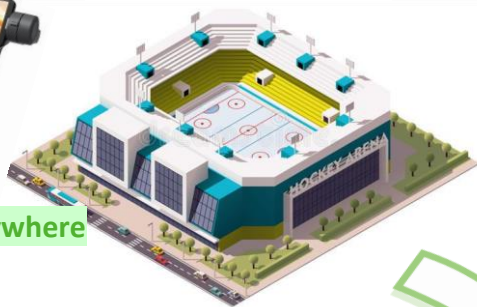




# Sports Arena



TVU Anywhere



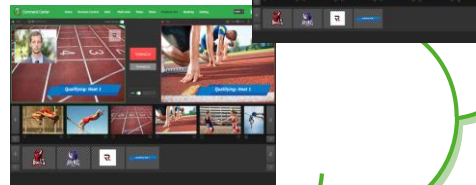
TVU One



TVU RPS



TVU Producer



## Production Hub

## Delivery



TVU Grid



metadata  
describe  
entities  
systems  
one  
information  
Data





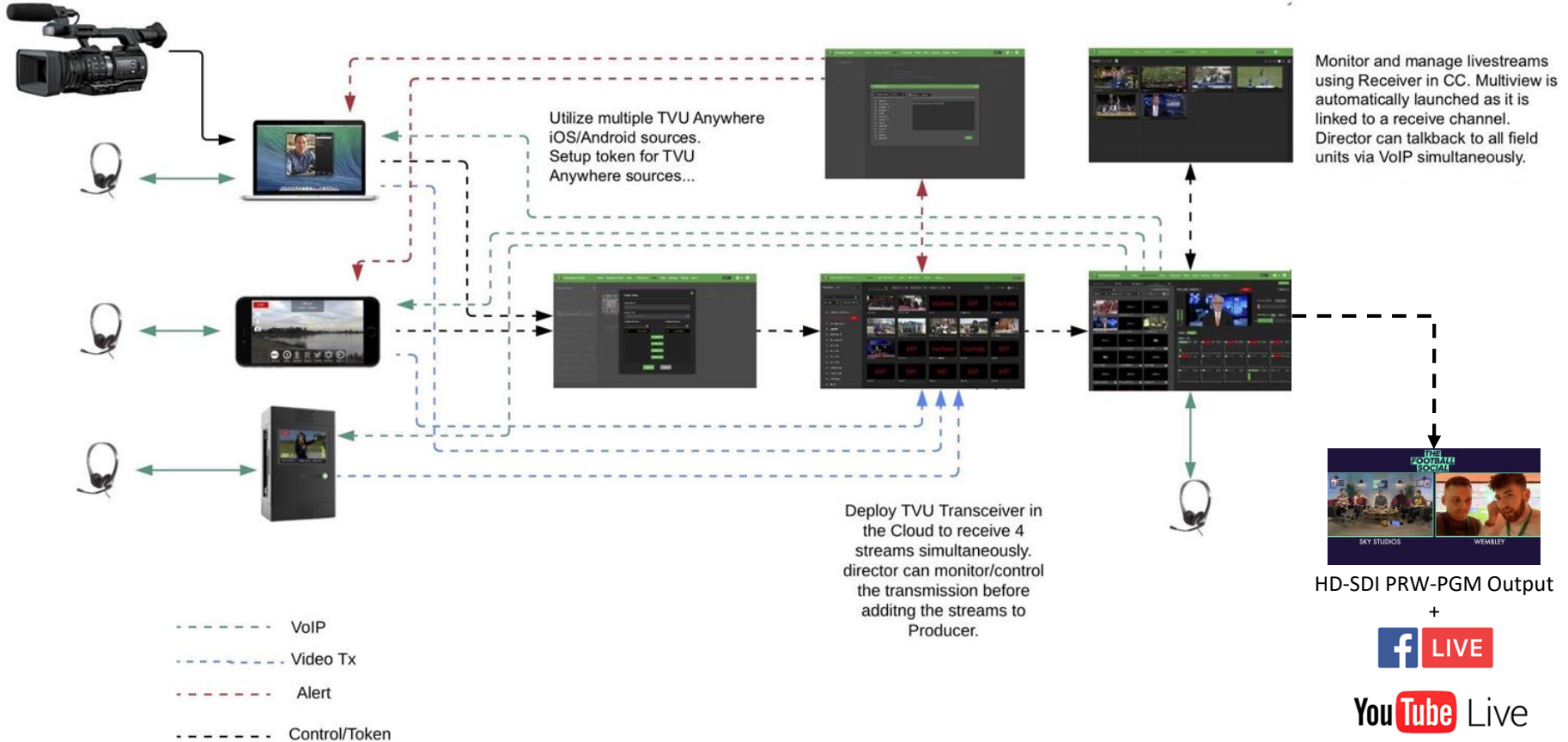
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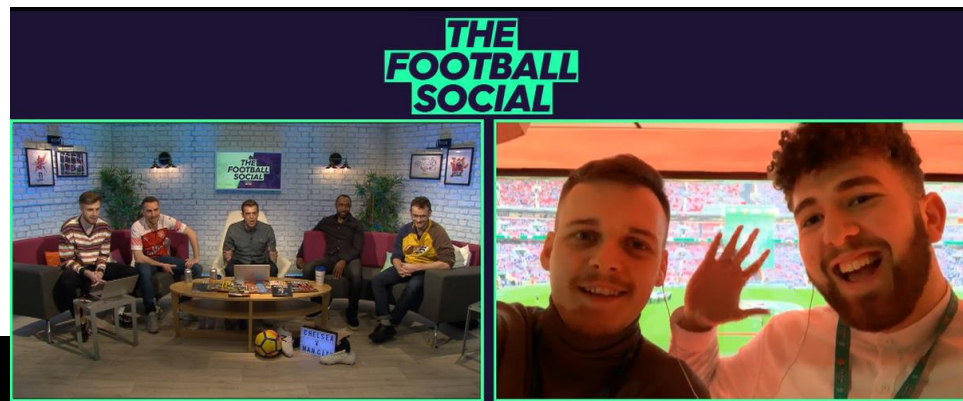
# TVU Talkshow

## TVU Talkshow, live audience participation solution

- Cloud based live production solution
- Connect with unlimited live video participants
- Managed "green room" for incoming calls
- Talk to participants via VoIP or IFB
- Support for preview and program SDI feeds
- Add as many SDI outputs as needed







SKY STUDIOS

WEMBLEY

TVU MediaMind®



SHARE

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**Easily and seamlessly  
share your live content  
production from anywhere**



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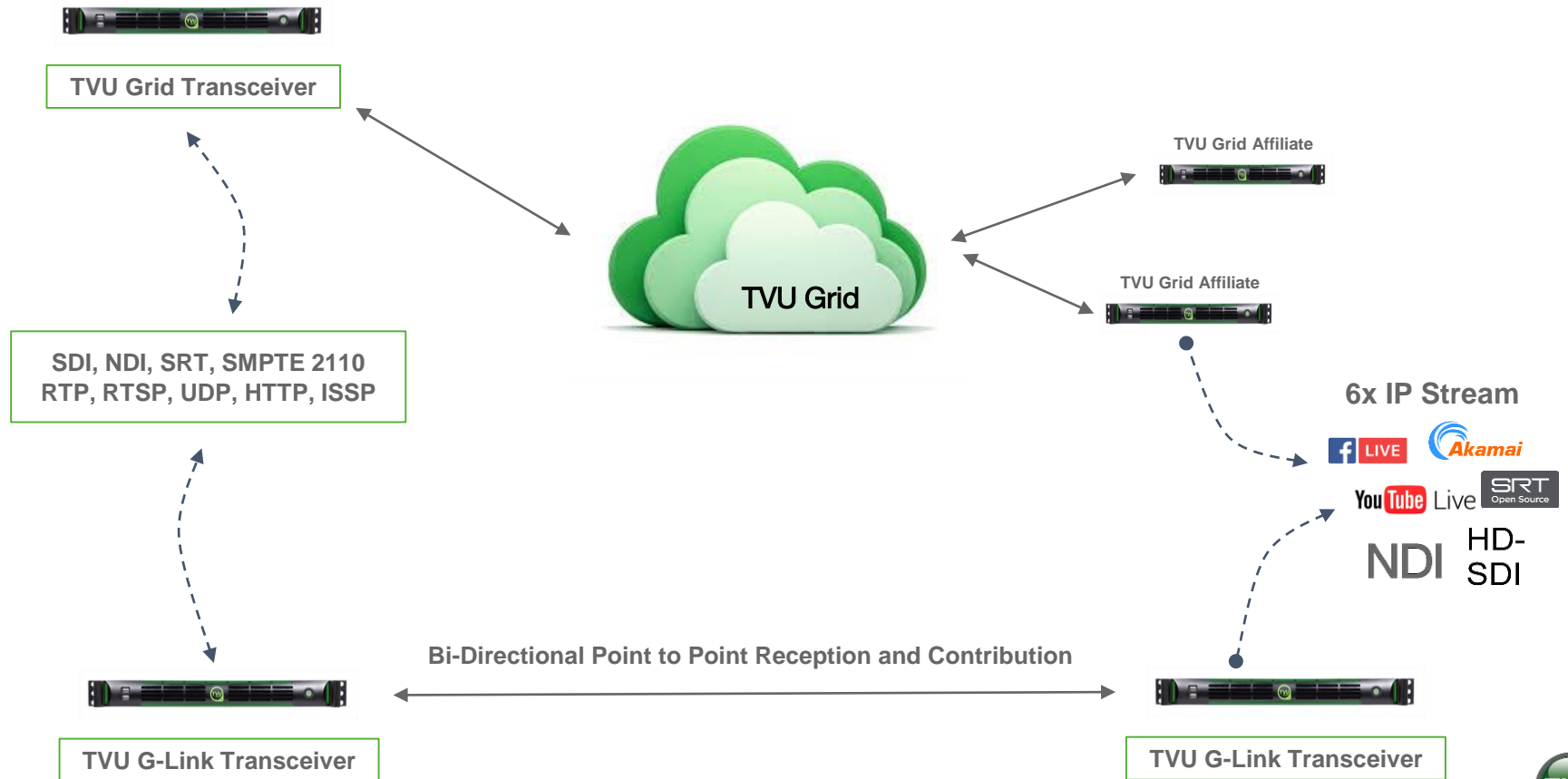
**TVU GRID®**

# Problems we solve

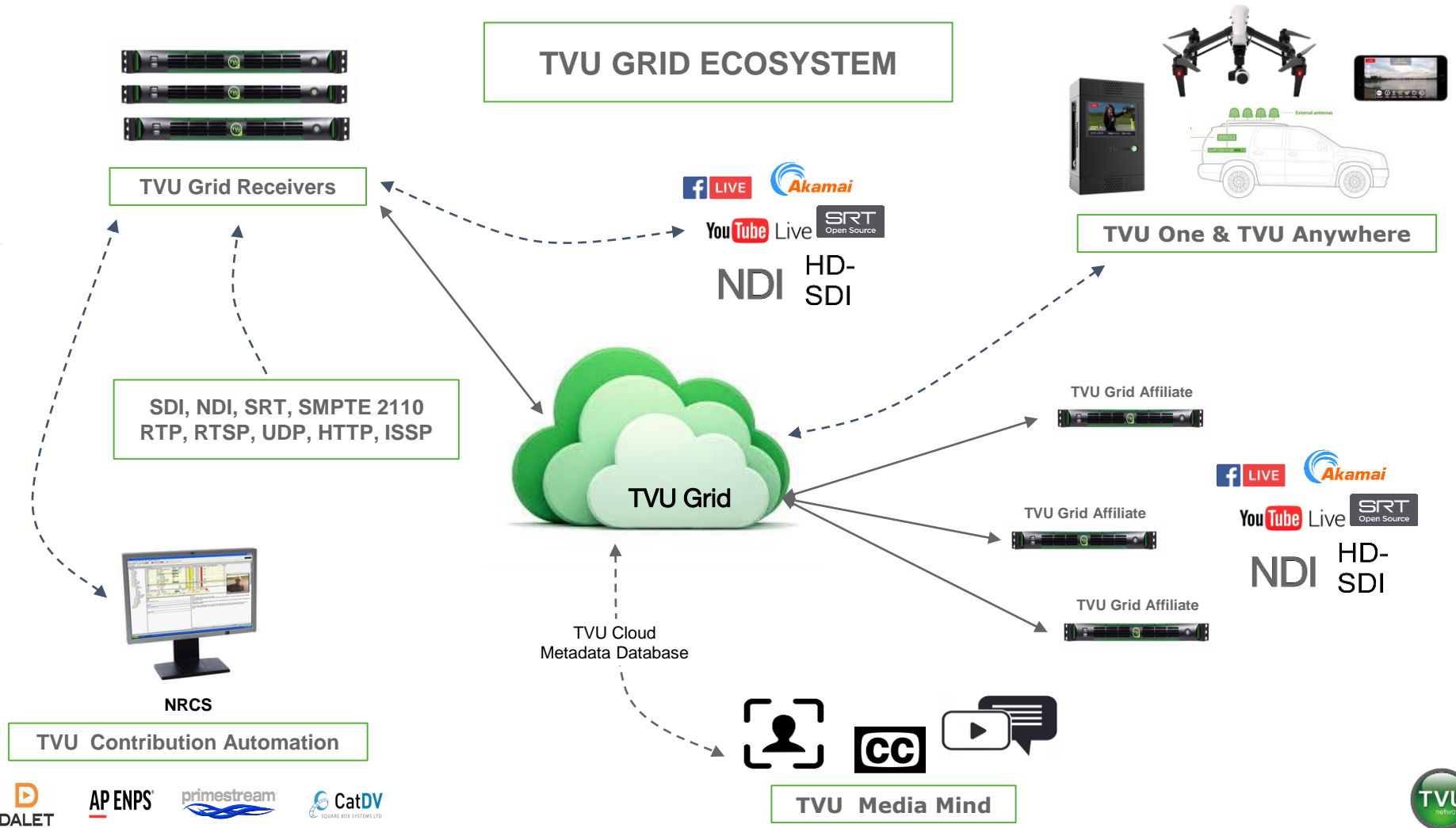
- ✓ Cost efficient live video sharing across content partners
- ✓ Quick turn key installation
- ✓ Super quick learning curve
- ✓ Cloud-based service, infinite multicasting
- ✓ Pay for what you use, use more when you need it
- ✓ One solution for contributing, transmitting and sharing
- ✓ Compatible with the rest of TVU's live content production ecosystem



# TVU GRID vs TVU G-LINK

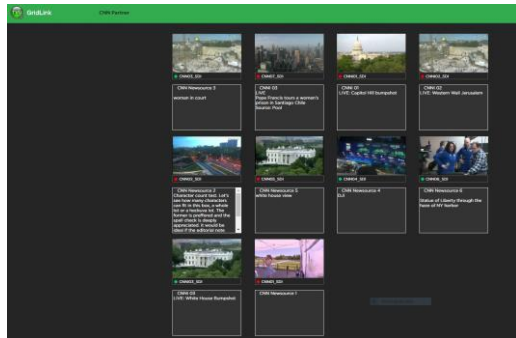
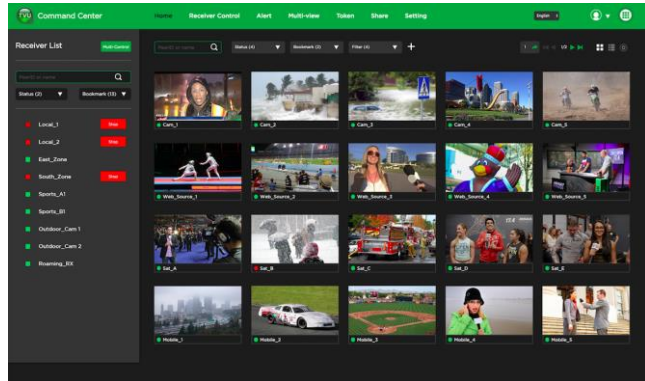


# TVU GRID ECOSYSTEM



# TVU Grid, unlimited scalability for video distribution

Live Video Switching, Routing and Distribution with Sub-second Latency



- Simple Operation
- Low Network Bandwidth Requirement
- Extremely Efficient FEC Transmission Algorithm: IS+
- Grid Source Can be from Anywhere
- Support Closed Captioning CEA 708 and OP-47
- Support up to 8 Audio Channels
- Metadata enrichment
- Frame Accurate Switch
- Live Grid Video Monitoring (Multiview)
- Hot Failover
- Grid API
- Unlimited Scalability
- Repurpose feeds for social media

## TVU Global Grid

Share live streaming content with hundreds of Grid receivers worldwide



- Search by affiliation or location
- Communicate through Grid platform
- Online request and approve



- Activate connections using Token
- Set period of activation
- Send to smartphones and receivers



## TVU Booking Service

- **Easy Booking Workflow** – Easy-to-use multiple streams management interface. Book any source with just the click of a mouse.
- **Simple User Management From Any Location** – Web browser interface accessible from anywhere.
- **Automated Configuration** – Automatically triggers the transmission without the need for human intervention.



# Global Rental Program & Trade-in Program





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# Other Products & Solutions



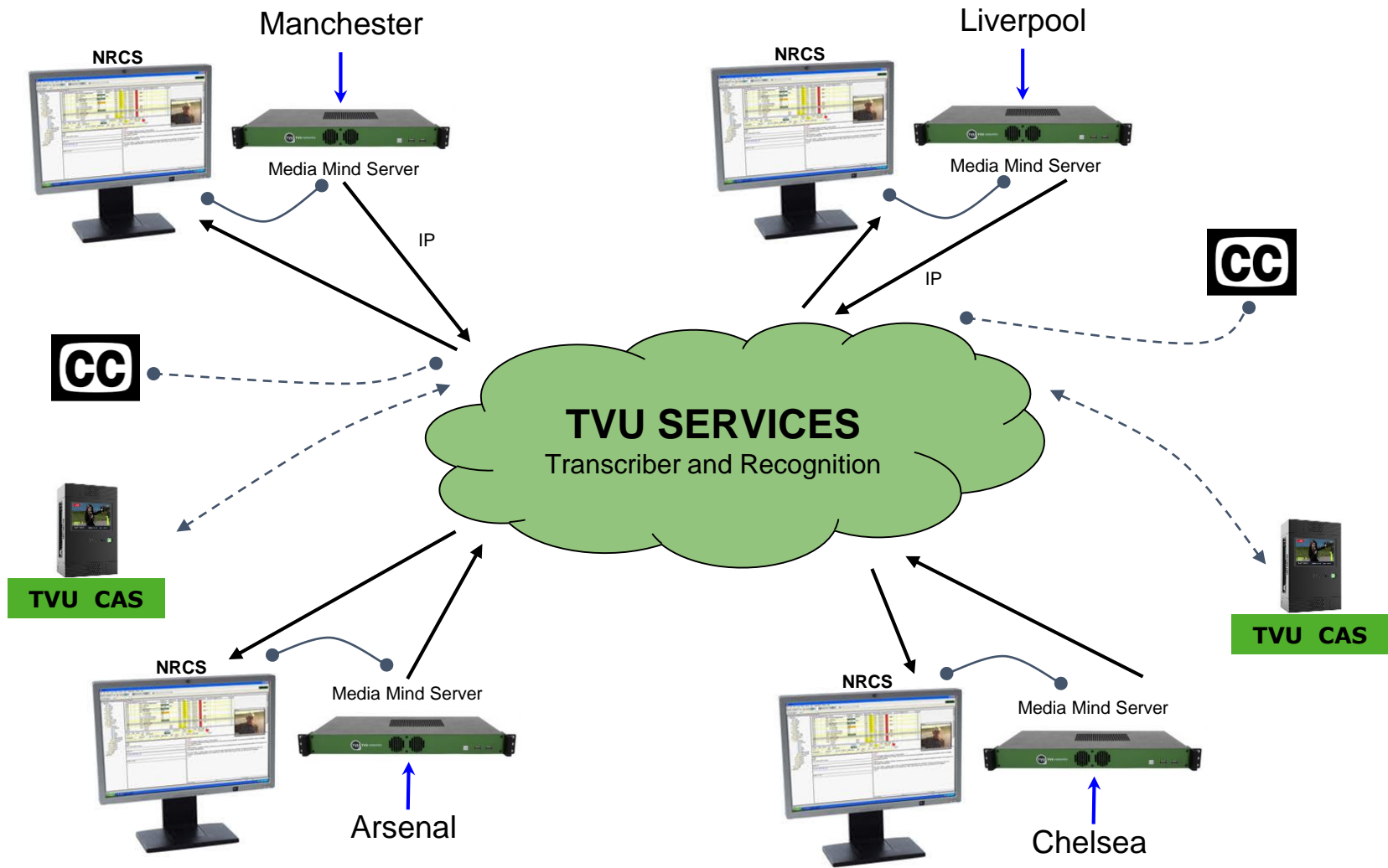
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# TVU TRANSCRIBER



# Problem we solve

- ✓ Cost efficient AI-based automated transcription service
- ✓ Direct access and control from NRCS to start feed transcription
- ✓ Copy and paste text directly to your editing tools
- ✓ Save to file or generate Closed-captioning
- ✓ Always available, fully scalable cloud service
- ✓ Works with existent TVU Equipment (requires upgrade)





## TVU Transcriber / How it works

- Live video is encoded by TVU Transcriber
- Live video speech is transcribed and processed in real-time in the cloud
- Speech-to-text available in different ways:
  - As real-time text keyed over the SDI or IP live video feed
  - As an editable file to be edited, stored or exported to other CC programs
  - As an xml file attachment to a video file exported to a MAM system



## TVU Transcriber / Additional features

- **TVU CC Failsafe**  
Allows system to take over the CC failures
- **TVU NRCS/MAM Integration**  
Search content already aired
- **TVU GFX Feed**  
Auto populate graphics content by transferring captured metadata to graphic templates
- **TVU Feed Alerts!**  
Make sure your journalists and viewers know before others when certain feeds are available



# The next generation of mobile transmitters



5G



## ▶ TVU One V3

- Supports native 4K encode (2160p/50/60) and transmission , as well as 1080p50/60 transmission
- Features 12G SDI inputs and HDMI v2.0
- Improved battery life
- Enhanced HEVC encoding for all video formats using next generation hardware video codec
- TM1000 and 1000G models available

**4K**  
**ULTRA HD**



▶ New Transceiver:  
**VS3550 / VS3500-4K / VS3500-2110**

**With Dual Power Supply**





▶ New Transceiver:  
VS3550 / **VS3500-4K** / VS3500-2110

4K



# New Transceiver: VS3550 / VS3500-4K / **VS3500-2110**



ST 2110



▶ New software upgrade – Version 7.5



## TVU v7.5 - Transceiver features

- Enhanced IP Connectivity

**NDI**<sup>™</sup> Network  
Device  
Interface

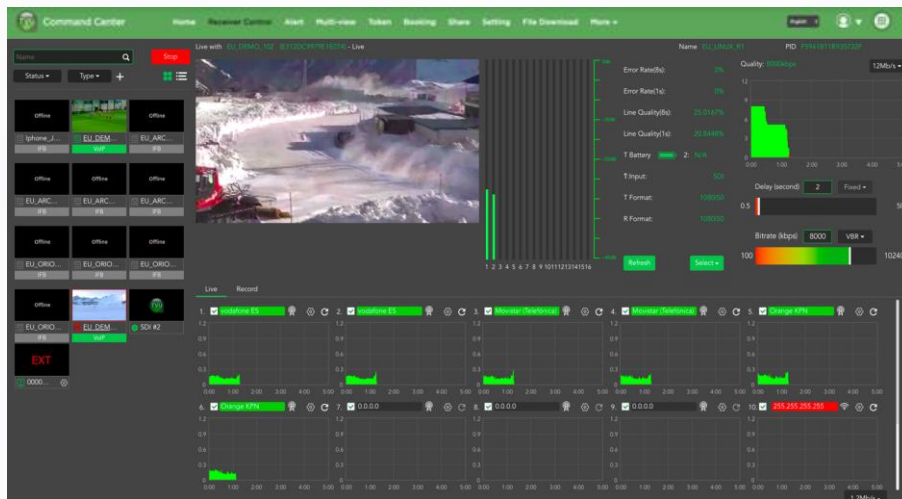




# TVU v7.5 - Transceiver features

## Enhanced Transceiver Command Center and Grid GUI

- New, full-featured Transceiver web GUI
- Features all the functions of the traditional Receiver Windows GUI





## Receiver List

Multi-Control

PeerID or name



Status (2)

Bookmark (13)

Local\_1 Stop

Local\_2 Stop

East\_Zone

South\_Zone Stop

Sports\_A1

Sports\_B1

Outdoor\_Cam 1

Outdoor\_Cam 2

Roaming\_RX

PeerID or name



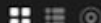
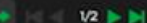
Status (4)

Bookmark (2)

Filter (4)



1



Cam\_1



Cam\_2



Cam\_3



Cam\_4



Cam\_5



Web\_Source\_1



Web\_Source\_2



Web\_Source\_3



Web\_Source\_4



Web\_Source\_5



Sat\_A



Sat\_B



Sat\_C



Sat\_D



Sat\_E



Mobile\_1



Mobile\_2



Mobile\_3



Mobile\_4



Mobile\_5



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# TVU CASE STUDIES



# TVU One 5G

Teaming up with **South Korea largest telecom company** to bring UHD broadcast over KT's 5G enterprise network - March 2019



Teaming up with SMG to conduct 5G transmission with TVU One for a **major Chinese conference** - March 2019







RPS ENCODER



RPS DECODER



The Betevé Story  
Live streaming a football  
competition with RPS.



## The ESPN Story - 300 TVU Anywhere kits

Featured prominently in players home during events like NFL & NBA drafts interviews. Collaborators and students join the show.





CNN03\_SDI

CNN Newsource 3  
woman in court



CNN07\_SDI

CNNI 03  
LIVE  
Pope Francis tours a women's  
prison in Santiago Chile  
Source: Pool



CNNI01\_SDI

CNNI 01  
LIVE: Capitol Hill bumpshot



CNNI02\_SDI

CNNI 02  
LIVE: Western Wall Jerusalem



CNNI02\_SDI

CNN Newsource 2  
Character count test. Let's  
see how many characters  
can fit in this box, a whole  
lot or a heckuva lot. The  
former is preferred and the  
spell check is deeply  
appreciated. It would be  
ideal if the editorial note



CNNI05\_SDI

CNN Newsource 5  
white house view



CNNI04\_SDI

CNN Newsource 4  
DJI



CNNI06\_SDI

CNN Newsource 6  
Statue of Liberty through the  
haze of NY harbor



CNNI03\_SDI

CNNI 03  
LIVE: White House Bumpshot



CNNI01\_SDI

CNN Newsource 1

Rectangular Snap



# France TV cover FIFA 2018 Celebration in Paris



Live from the top of “Arc de Triomphe” using TVU One and TVU Router combined.

**France Televisions was the only channel able to cover the Live perfectly with close to 1 million fans celebrating the win on the Champs Elysées.**