

The background of the slide is a night-time aerial view of a city, likely Hanoi, with its lights and buildings. A semi-transparent network of white lines and nodes is overlaid on the city, symbolizing connectivity and technology.

# USING LOW-LATENCY STREAMING TECHNOLOGIES IN REMOTE PRODUCTION

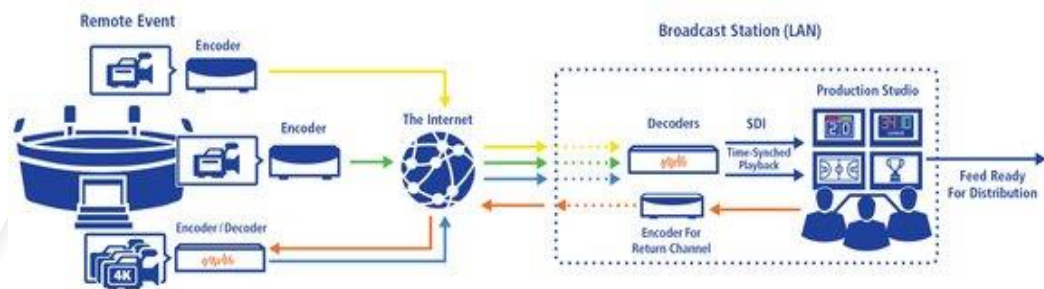
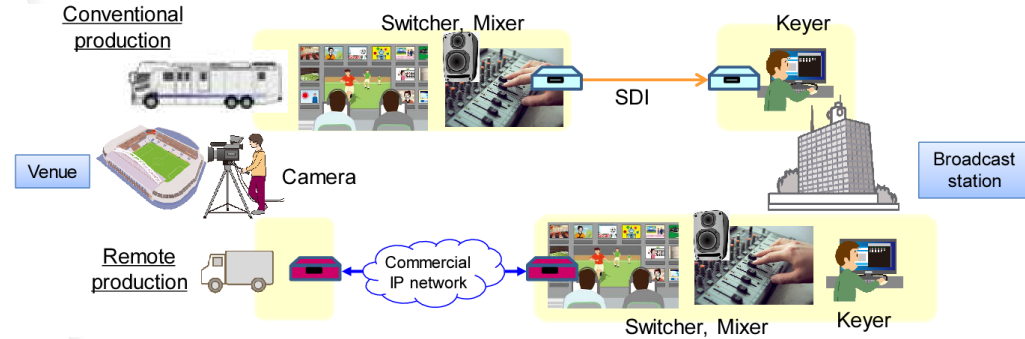
Phan Tiến Dũng  
VOICE OF VIETNAM

# REMOTE PRODUCTION

- **Remote production is a broadcast workflow where content is captured live at a remote location while production is performed at a main studio.**

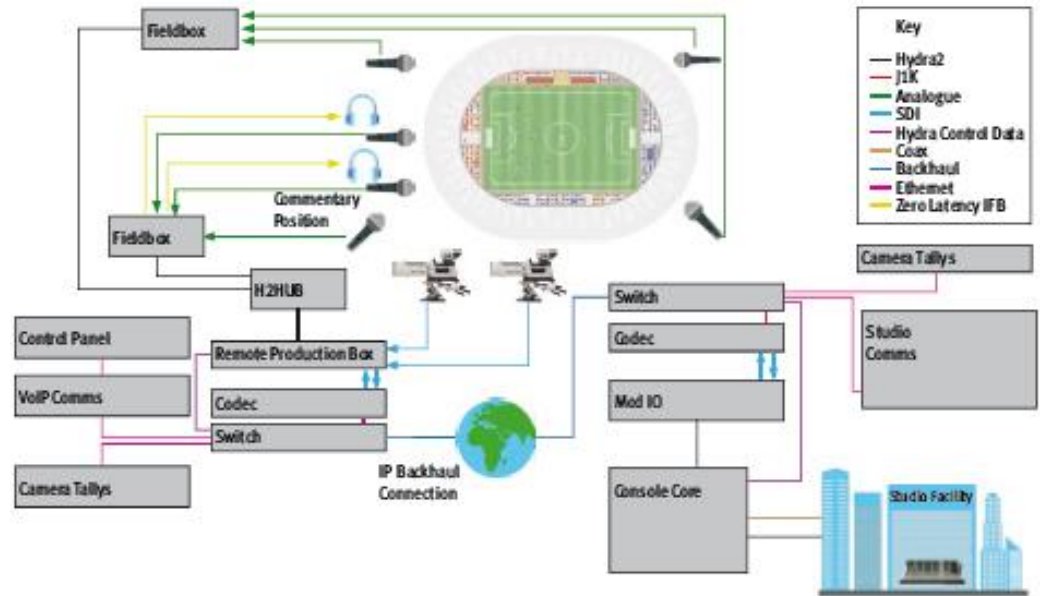
- **Advantages of remote production**

- Less movement of materials and machinery;
- Fewer people needed at the production venue;
- Fewer problems relating to transferring human resources (e.g. jet lag, eating problems, emotional and organisational stress, etc.);
- Travel with lighter technology;
- Simpler set-up.



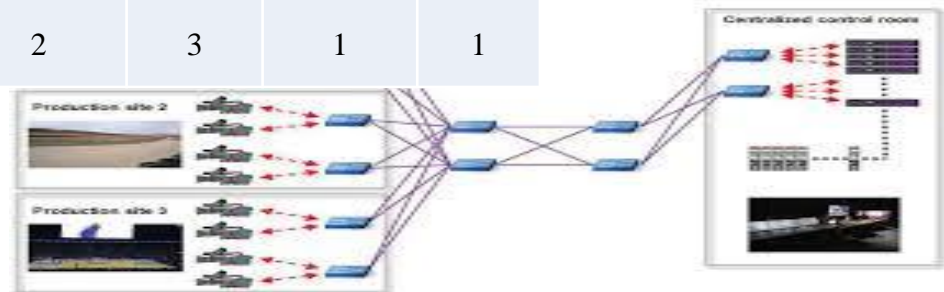
# REQUIREMENTS FOR REMOTE PRODUCTION

- Secure and reliable
- **Ultra-low latency**
- Open and interoperable
- Cloud enable
- Camera Tallys
- Intecom

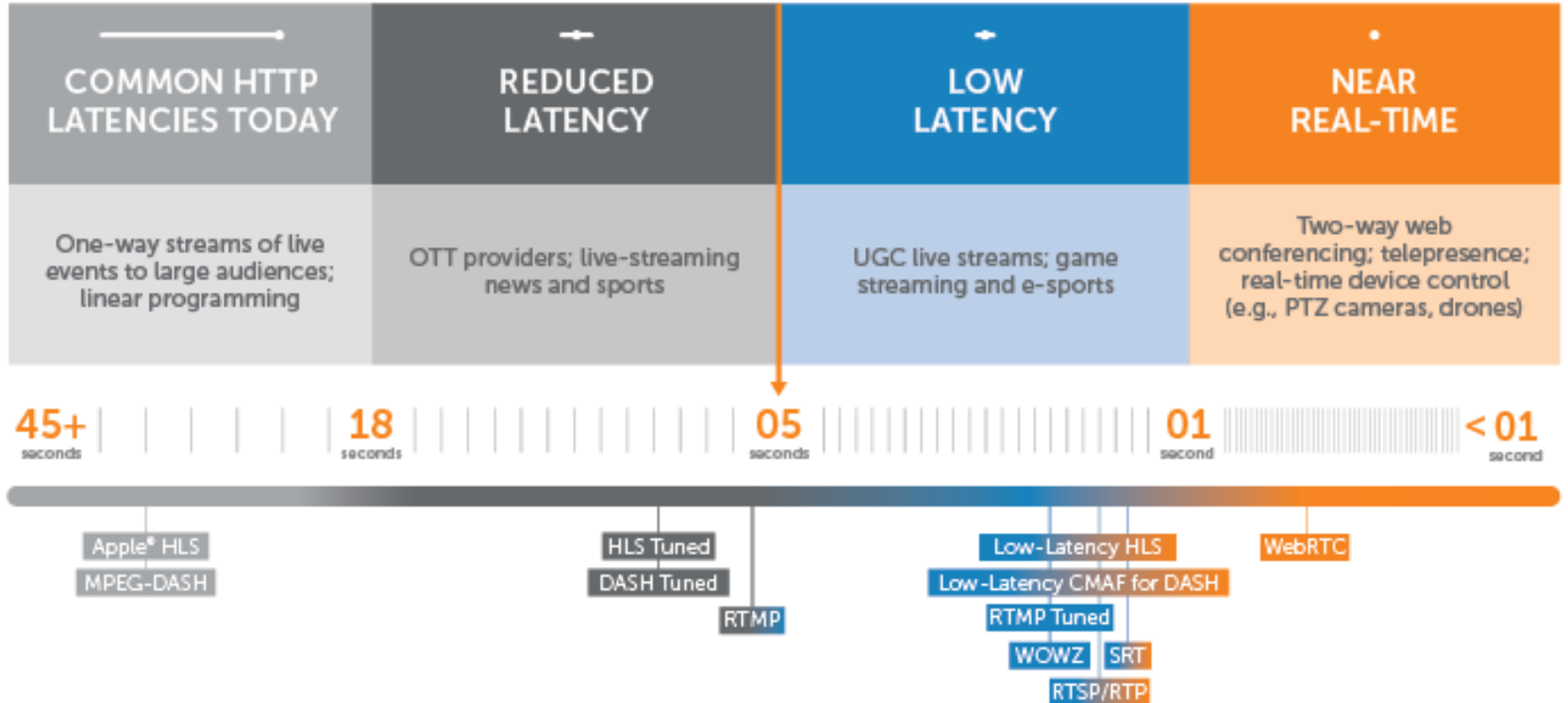


# TRANSMISSION METHOD IN BROADCAST

No	Method	Cost	Quality	Deployment	Latency	Multipoint	Distance
1	Fiber optic + Converter EO, OE	3	1	3	1	3	3
2	Leasedline IP+ Professional Encoder, Decoder	2	2	3	3	3	2
3	<b>Internet + Encoder, Decoder</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>
4	Satellite + Professional Encoder, Decoder	2	2	2	3	1	1

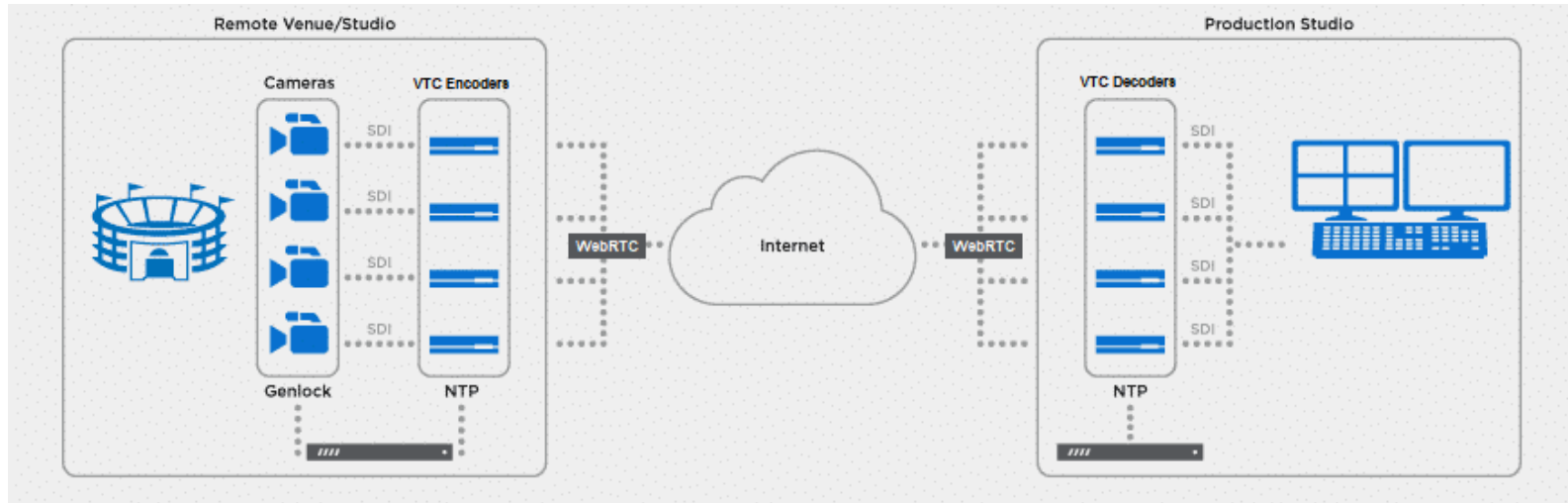


# LATENCY IN STREAMING

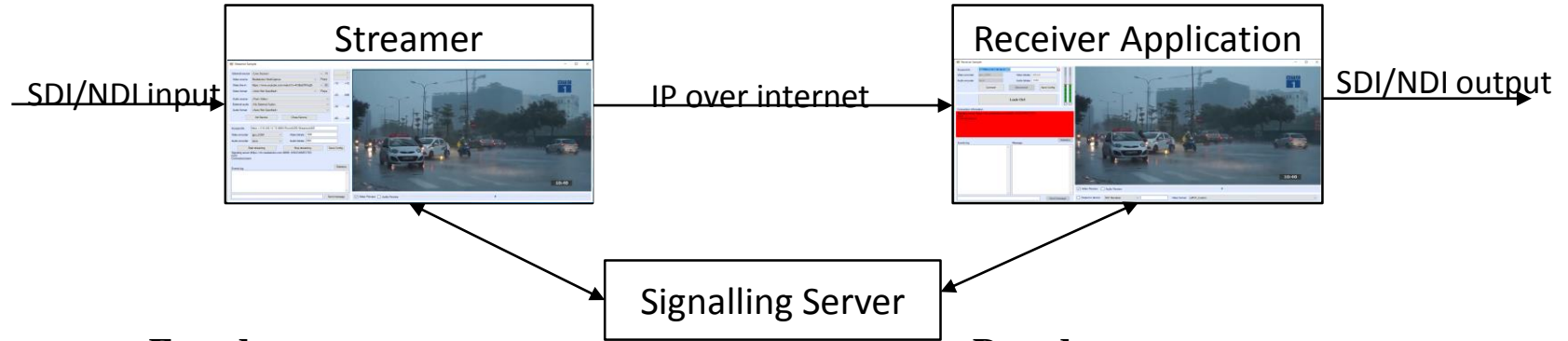


# VTC SOLUTION FOR SIGNAL TRANSMISSION

- For professional camera: VTC Streamer App on Windows platform
- For smart phone: VTC CTV app
- Backup transmission (cloud enable): LiveU, TVU



# WEBRTC APP IN WINDOWS



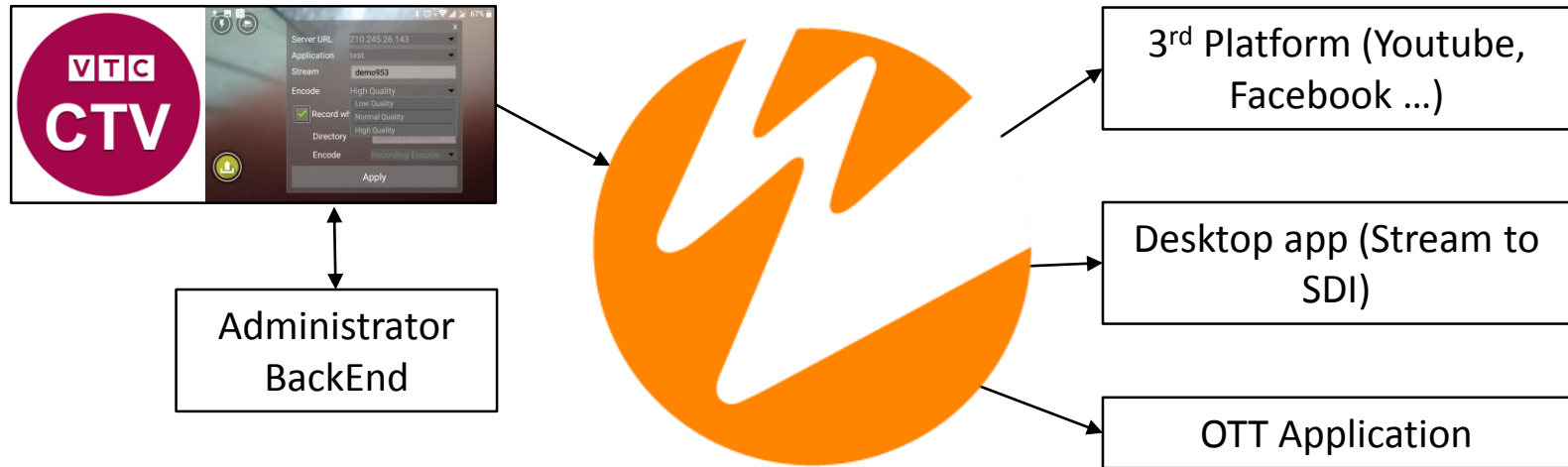
## Encoder

Input: SDI/NDI  
 Output: IP  
 Protocol: WebRTC  
 Encode Video: H.264/H.265  
 Audio: Opus  
 Low Latency transmission

## Decoder

Input: IP  
 Output: SDI/NDI  
 Protocol: WebRTC, RTMP  
 Decode Video: H.265/H.264  
 Audio: Opus  
 Delay: 300ms-500ms

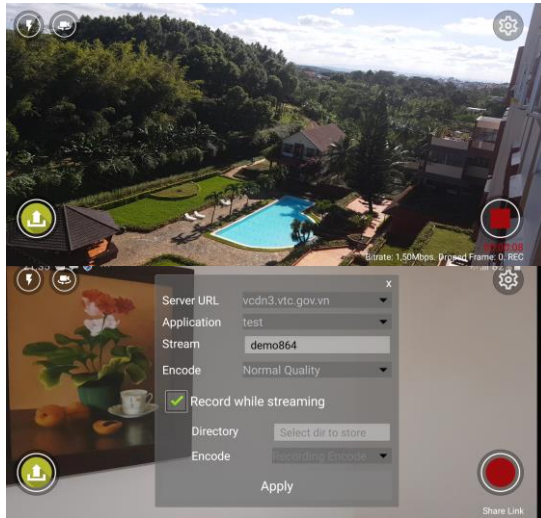
# VTC CTV LIVESTREAM APPLICATION



<https://play.google.com/store/apps/details?id=com.vtc.ctv>



# VTCCTV APP SPECIFICATION



## Live stream

Encode: H.264, H.265 (adaptive bitrate)

Upload file to server

Administrator web interface



## Player

Decode Video: H.264, H.265

(multiple profile, adaptive bitrate)

EPG information

# PROGRAM “MUÔN VẠN TÌNH THƯƠNG YÊU”

