



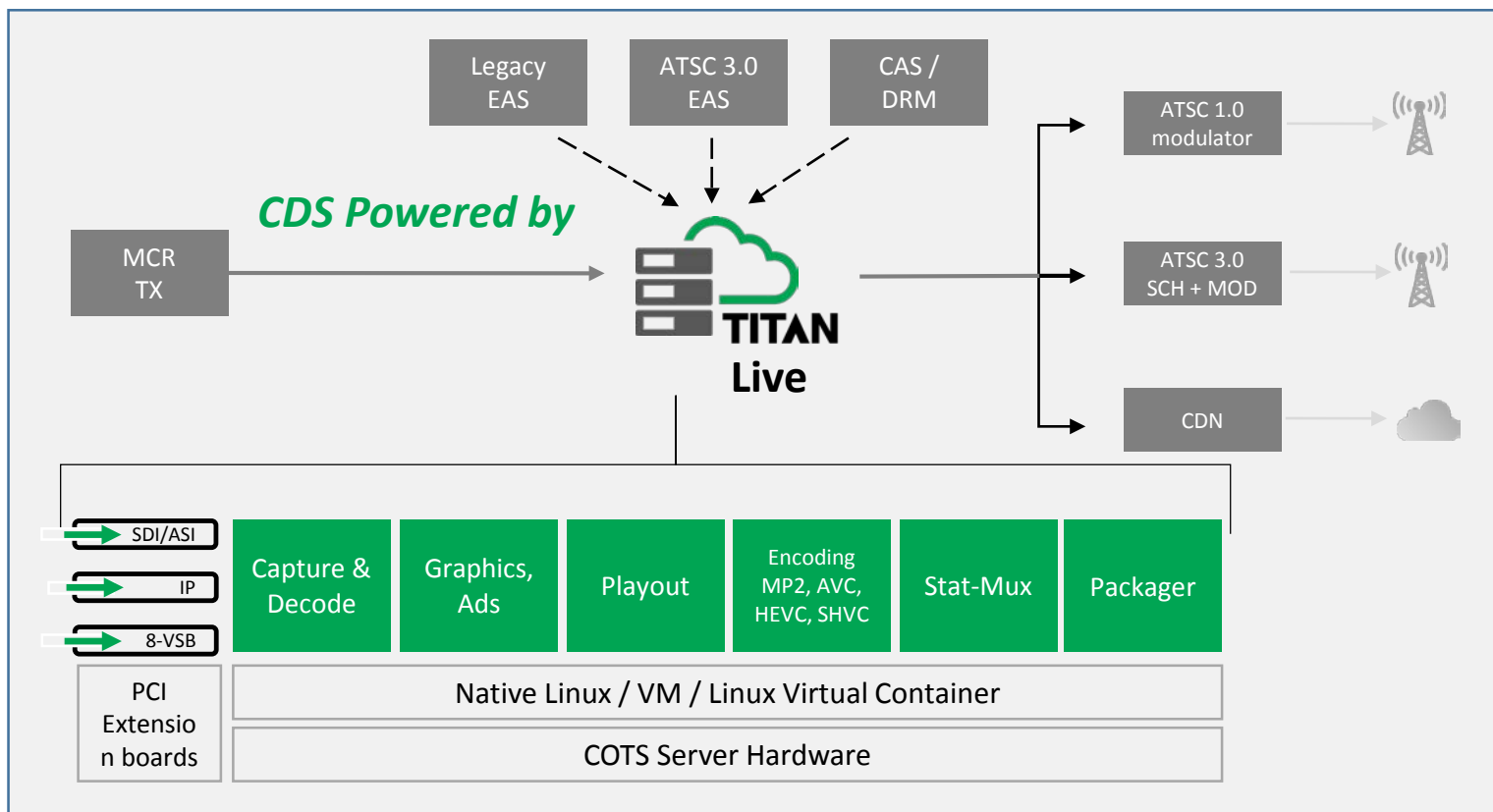
Comark Digital Services

- *DTV Encoding Solution*
- *MAX VQ – MIN Bandwidth*
- *Mobile to UHD Resolutions*
- *Software Based*
- *ATSC 1.0 and 3.0*
- *OTA and OTT*



Converged Solution for ATSC 1.0 and ATSC 3.0

MPEG encoding solutions are swiftly moving away from dedicated ASIC/hardware (1RU) based platforms to software (SW) solutions. SW encoding solutions are perfectly suited for OTA terrestrial distribution and multi-screen delivery, as well as Linear and On Demand experiences.



Powered by **TITAN Live**, Comark Digital Services (CDS) offers a converged software-based platform for live video compression, stream processing, and control/management. The solution is flexible allowing for deployments via bare metal (1RU server), blade server, or virtualized in the cloud.

- ✓ High Video Quality (VQ) – High Density
- ✓ Pure CPU solution, Linux, Windows, VM
- ✓ Mobile to UHD resolutions support
- ✓ HEVC, H264, MPEG2
- ✓ Low-latency Mode
- ✓ Audio levelling (CALM)
- ✓ Channel branding – logo insertion
- ✓ Optimized statistical MUX over IP
- ✓ Flexible redundancy, 1+1, N+1, N+M

ATSC 1.0: See immediate improvements to existing over-the-air (OTA) signals with higher video quality (VQ) and improved bandwidth usage, especially in channel share scenarios.

- 3HD and 3SD in a single 19.4Mbps OTA RF channel
- Integrated Stat-MUX

ATSC 3.0: Software encoding licenses are per input and are “all inclusive”. This single CAPEX model provides unlimited output formats and allows a seamless upgrade from ATSC 1.0 to ATSC 3.0.

- SD/HD and UHDp60 resolutions
- UHD, HDR, SHVC for ATSC 3.0
- DASH, MMT packagers included

CDN: The all inclusive model offers a complete distribution solution for both main screens and multi-screen applications, including CDN and OTT.

- Live program distribution
- Time-shifted viewing
- Live-to-VOD

KEY BENEFITS:

- ▶ SW solution provides flexibility with 1RU server, blade server, VM
- ▶ Advanced encoding yields the highest VQ with the lowest bit rate
- ▶ Future-Proof architecture easily scales from ATSC 1.0 to ATSC 3.0
- ▶ Encoder licenses are licensed per input with unlimited output formats
- ▶ High availability with 1+1, N+1, and N+M redundancy options
- ▶ IP Optimized Platform Maximizes Technology Evolution

Encoding Specifications:**Video Compression**

- MPEG2 MP@HL, MP@ML
- H264 HP@L4.2, MP@L4.1; 4:2:0/4:2:2 10-bit
- HEVC Main10@L5.1 (UHD)

Resolutions

- UHD 3840 x 2160
- HD 1080 x (1920, 1440, 1280, 960), 720 x (1280, 960, 640)
- SD NTSC 480 x (720, 704, 640, 544, 528, 480, 352), PAL 576 x (720, 704, 544, 528, 480, 352)

Frame rates

- Progressive 59.94, 50, 29.97, 25
- Interlaced 29.97, 25

Encoding bit rate

- Up to 50Mbps
- CBR, Capped VBR, Statmuxed VBR

Audio Compression formats

- MPEG-1 Layer II
- AAC-LC, AAC-HEv1/v2
- Dolby® Digital, Dolby® Digital Plus
- Sampling frequency: 32, 44.1, 48 KHz
- Dolby® Digital, Dolby® Digital Plus, Dolby-E Passthru

Input Interfaces:**TS/IP Input**

- UDP/RTP (IGMPv3 multicast, unicast)
- MPEG-2 TS (SPTS/MPTS)
- Video decoding: MPEG-2/MPEG-4 AVC
- Audio decoding: MPEG-1 Layer II, AAC-LC, AAC-HE v1/v2, Dolby Digital, Dolby Digital+, Dolby-E

SDI Input

- 8x 3G-SDI Mini BNC (SMPTE-424M and SMPTE 425, Level A or Level B)
- Audio embedded in SDI

RTMP Input**Multiplexer:**

- Grooming and re-multiplexing
- Stream routing any input – any output
- PID filtering/remapping

Output Interfaces:**TS/IP**

- UDP, RTP (IGMPv3 multicast, unicast)
- ST2022-1/2 (any FEC dimensions)
- Up to 256 SPTS/MPTS, 1 GB per physical connector

TS/DVB-ASI*

- MPEG2-TS, 188 or 204 bytes
- Up to 256 SPTS/MPTS, 210 mbps per physical connector
- 4 GbE ports, additional 1 GbE/10GbE ports can be added through extension cards

Automation Interfaces:**Metadata/VBI**

- VPS, VPI, VITC, ATC, SMPTE2031

Digital Program Insertion

- SCTE 35 pass through
- SCTE35 insertion via SCTE104 triggers
- ESAM (SCC API)

CDN integration:

- Akamai certified
- Compatible with leading CDN's

Packager:

- UDP/RTP
- MPEG-2 TS (SPTS & MPTS)
- Apple® HTTP Live Streaming
- Microsoft® Smooth Streaming (fragmented MP4 PIFF format)
- RTMP
- DASH ISO Streaming format
- HDS
- Multi-bitrate TS (ATS with EBP)

Configuration and Management:

- HTML Web Graphic User Interface
- SNMP (MIB v2c) with remote SNMP supervisor
- Northbound REST API
- N+1 Redundancy management via AMS

HITACHI-COMARK OVERVIEW

High performance, award-winning TV transmitters backed by more than 45 years of leadership in inductive output tube (IOT), solid-state broadcasting, and multimedia products and technologies:

Hitachi Kokusai Electric Comark LLC provides concrete solutions for the demands of today's global TV broadcast industry.



Corporate Office in Southwick, MA

Hitachi Kokusai Electric Comark LLC

104 Feeding Hills Road
Southwick, MA 01077, U.S.A.
Tel: (413) 998-1100
Fax: (413) 998-1178
Toll Free Tel: (800) 288-8364

sales@comarktv.com

Customer Service E-mail:
support@comarktv.com

www.comarktv.com