

Studio protocols — Zixi · NDI · SMPTE ST 2110 (2026)

Three protocols, three different jobs. Where each one wins, what each one is built on, and what they cost to run.

NDI 6 / NDI 6.3

Vizrt NDI · royalty-free SDK · NDI 6 (Apr 2024), NDI 6.3 (NAB 2026)

- **Job:** studio LAN video transport.
- **Runs on:** 1 - 10 Gigabit Ethernet, switched fabric.
- **Transport:** TCP default; UDP + FEC, Multi-TCP, Reliable UDP options.
- **Discovery:** zero-config via mDNS (Bonjour).
- **Codec:** Full NDI = SpeedHQ intra-frame, visually lossless. NDI HX3 = H.265 or H.264 4:2:0.
- **Bandwidth (1080p60):** Full NDI $\approx$ 125 Mbps; NDI HX3 $\approx$ 50 Mbps.
- **Latency:** sub-two-frame for Full NDI; < 100 ms for NDI HX3.
- **Carries:** video, multi-channel audio, alpha, metadata, PTZ control, tally, KVM.
- **NDI 6 added:** HDR (PQ + HLG), 10+ bit colour, embedded NDI Bridge in hardware.
- **NDI 6.3 added:** multi-source monitoring, HDCP for secure ProAV.
- **Use when:** OBS / vMix / ProAV / e-learning production on a LAN.
- **Avoid:** as a public-internet contribution protocol — use NDI Bridge over private WAN.

SMPTE ST 2110

SMPTE · multi-part suite published from 27 Nov 2017 onwards

- **Job:** facility-grade IP replacement for SDI.
- **Runs on:** 25 / 100 / 200 Gigabit Ethernet, engineered fabric.
- **Transport:** RTP per RFC 4175 over multicast UDP.
- **Timing:** PTP IEEE 1588 mandatory, profiled by SMPTE 2059-2.
- **Control plane:** AMWA NMOS — IS-04, IS-05, IS-07, IS-08, IS-09, IS-10.
- **Essence:** -20 uncompressed video, -22 JPEG XS lightly-compressed, -30/-31 audio, -40 ancillary.
- **Bandwidth (1080p59.94):** 2.1 - 3 Gbps uncompressed; $\approx$ 300 Mbps with JPEG XS.
- **Bandwidth (2160p59.94):** 8 - 12 Gbps uncompressed.
- **Latency:** sub-frame, deterministic, dominated by PTP precision.
- **Use when:** network news, sport, Olympic-scale production, premium content.
- **Avoid:** trying to tunnel raw ST 2110 over the public internet.
- **WAN path:** ST 2110-22 JPEG XS + RIST Advanced Profile.

Zixi

Zixi Inc. (founded 2006) · acquired by Clearhaven Partners Jun 2024

- **Job:** WAN contribution between facilities.
- **Runs on:** UDP (default 2088 / 2077) and TCP (4444 mgmt).
- **Reliability:** adaptive FEC + ARQ + bonding + hitless failover.
- **Encryption:** AES-128 / 192 / 256.
- **Components:** Feeder, Receiver, Broadcaster (multi-protocol gateway), ZEN Master (cloud control plane).
- **Latency:** sub-second to a few seconds, configurable.
- **Standards posture:** proprietary, SDK-licensed, no public RFC.
- **Ecosystem:** Zixi Enabled Network — vendor-quoted 1400+ customers, 400+ partners.

- **Use when:** legacy Zixi paths, multi-protocol gateway role, vendor-supported orchestration.
- **Avoid:** as a new-build greenfield contribution protocol if SRT or RIST fits — open is cheaper.
- **Open alternatives:** SRT (Haivision) · RIST (VSF TR-06).
- **Note:** Zixi *Broadcaster* commonly emits SRT, RIST, RTMP, HLS, DASH on egress.

Which protocol wins on which criterion (2026)

Criterion	NDI	ST 2110	Zixi
Network type	Studio LAN	Facility fabric	Public-internet / private WAN
Typical wire speed	1 - 10 GbE	25 - 100 GbE	100 Mbps - 1 GbE WAN
Compression	SpeedHQ / H.264 / H.265	None (or JPEG XS)	Codec-agnostic carrier
Latency	Sub-two-frame to 100 ms	Sub-frame	Sub-second to a few seconds
Synchronization	Best-effort	PTP IEEE 1588 mandatory	Stream-internal
Multicast support	Yes (newer modes)	Yes (mandatory)	No (unicast)
Carries video + audio + ancillary	All in one stream	Separate RTP streams	Encapsulates an MPEG-TS or similar
Licensing	Royalty-free SDK	Open standards (paywalled)	Proprietary, SDK fee
Standards body	Vizrt / NDI Group	SMPTE + AMWA + IETF	None — vendor-owned
Right answer for...	OBS / vMix / ProAV	Premium broadcast facility	Legacy or vendor-managed contribution

Decision tree (read top to bottom)

1. Are you moving video inside one building over an existing Ethernet LAN?

→ Yes: use **NDI**. Sub-frame, royalty-free, sits inside OBS / vMix.

2. Are you building a broadcast facility with PTP, NMOS, and uncompressed essence?

→ Yes: build on **SMPTE ST 2110**. Plan for 25 - 100 GbE and PTP.

3. Moving compressed video between facilities or over the public internet?

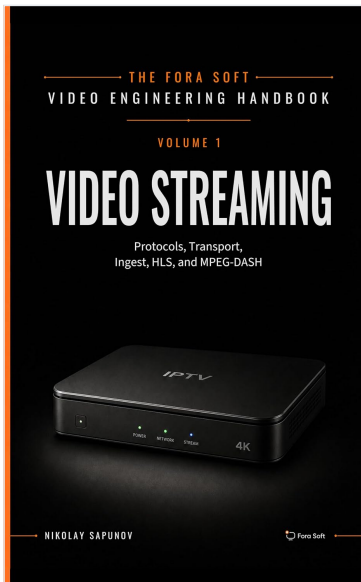
→ New build: **SRT** or **RIST** first. **Zixi** for legacy or vendor-managed paths.

4. Need to deliver to consumer viewers over the open internet?

→ None of the three. Use **HLS / LL-HLS / DASH / WebRTC** downstream of a packager.

Key spec citations (read these, not blog summaries)

- **ST 2110-10:2022** — System timing & definitions.
- **ST 2110-20:2022** — Uncompressed active video (RFC 4175 payload).
- **ST 2110-22:2019** — JPEG XS constant bit-rate compressed video.
- **ST 2110-30:2017 / -31:2022** — Audio (AES67 / AES3).
- **ST 2110-40:2023** — Ancillary data (captions, timecode).
- **IEEE 1588-2019** — PTP. Profiled by **SMPTE 2059-2**.
- **AMWA NMOS** — IS-04, IS-05, IS-07, IS-08, IS-09, IS-10 at specs.amwa.tv.
- **NDI** — Vizrt docs at docs.ndi.video; NDI 6 launched 3 Apr 2024.
- **Zixi** — vendor docs at docs.zixi.com; acquired by Clearhaven Jun 2024.
- **JT-NM Tested** — EBU + SMPTE + VSF + AMWA conformance catalogue.



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Video Streaming: A Complete Guide to Video Delivery

From Network Protocols and Transport to Ingest, HLS, and MPEG-DASH

By Nikolay Sapunov, CEO at Fora Soft · 1,124 pages · Kindle & paperback on Amazon

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This sheet compares NDI, SMPTE ST 2110 and Zixi by job, network, timing and licensing, with a decision tree and the key specs. Volume 2 covers the contribution side in depth: UDP and TCP behaviour, NAT, ingest over SRT, RIST and RTMP, and the latency budget from camera to packager.

WHAT YOU WILL FIND INSIDE

- Contribution over SRT and RIST vs proprietary carriers
- Ingest paths from studio to cloud packager
- UDP, FEC and retransmission on lossy WAN links
- Latency budgets from camera to first segment

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Connecting a studio, NDI or ST 2110 facility to cloud streaming?

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