

# Federation Architecture Decision Guide

Run many sites as one: record at the edge, stream on demand, keep each site autonomous. Engineering guidance, not legal advice.

## The bandwidth model: record at the edge, stream on demand

Centralizing every stream does not scale: 1,500 cameras x 4 Mbps = 6 Gbps sustained into one site - impossible on a WAN. Federation records locally and sends only (a) a sync trickle (Milestone: site identity, < 1 MB every 10 min) and (b) the cameras someone is actively watching. Size the WAN for VIEWING, not for total cameras: viewed cameras x stream bitrate. Example: 25 cams x 4 Mbps = 100 Mbps, or ~13 Mbps on low-res substreams. Storage stays per-site - federation centralizes the view, not the disks.

## Four ways to run more cameras than one site (pick by where recording lives and WAN tolerance)

Pattern	Recording lives	WAN-outage tolerant?	Cross-vendor?	Best fit
Single distributed VMS	Recording servers on one LAN	N/A (one site)	No (one platform)	One building / campus, fast LAN
Federation	At each site; parent holds none	Yes - sites run alone	No - same vendor	Many owned sites, stable WAN, autonomy
Interconnect	Central records selected remote cams	Partial (buffer/forward)	No - same vendor	Small/remote sites, weak links, no local VMS
Cloud-native (VSaaS)	Edge bridge buffers; cloud copy	Yes - bridge records on	Limited	Greenfield, many sites, minimal on-site IT

## Warning: cross-vendor is PSIM, not federation

There is NO open standard for federating one VMS under another. ONVIF (Profiles S/G/T/M) standardizes the CAMERA-to-VMS boundary, not the VMS-to-VMS boundary. You can federate a vendor's platform only under itself (Milestone under Milestone, Genetec under Genetec - and even that can be one-directional). A single view across DIFFERENT VMS brands needs a PSIM layer or a custom integration over each platform's SDK/API. That is integration work - budget it as such.

## Stage the rollout (checklist)

[ ] Design each site as a standalone system first - cameras, recording servers, local storage, local retention. [ ] Size the WAN for PEAK simultaneous viewing (substream for walls/mobile, main stream on click), not total camera count. [ ] Design per-site / per-camera / scheduled permissions BEFORE connecting anything. [ ] Stand up and validate each site, then attach it to the hierarchy (a few clicks - no extra servers/licenses in Milestone). [ ] Keep storage, retention, and backup per-site - federation is not a backup strategy. [ ] Crossing borders? Centrally viewing footage from another country can be a cross-border transfer (GDPR Chapter V) - confirm the basis.

Engineering guidance, not legal advice. Vendor names illustrate the same-vendor rule and are not endorsements; verify version-specific federation behavior in the vendor's current admin guide, and confirm any cross-border transfer basis with qualified counsel.