AI at the Industrial Edge: Designing Networks that Deliver

Practical design guidance for machine vision, AI inference, and real-time OT workloads

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Just like an espresso machine
needs good pipes,
AI needs a well-designed
network.

Cisco sees the network as the key to unlock software-driven industrial automation and industrial AI

Brains

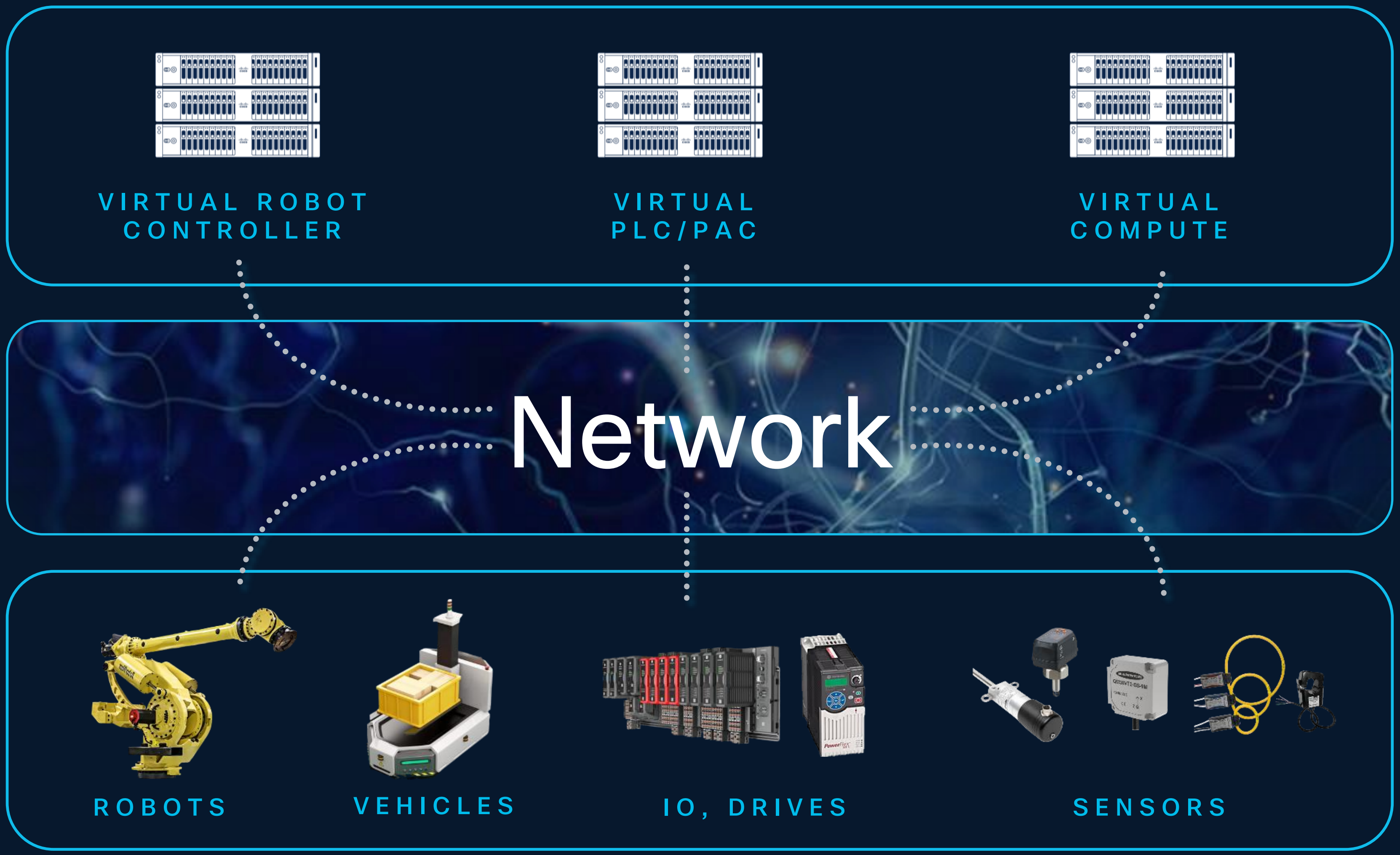
in the data center

Nervous system

is the network

Physical components

on the factory floor



Webex App

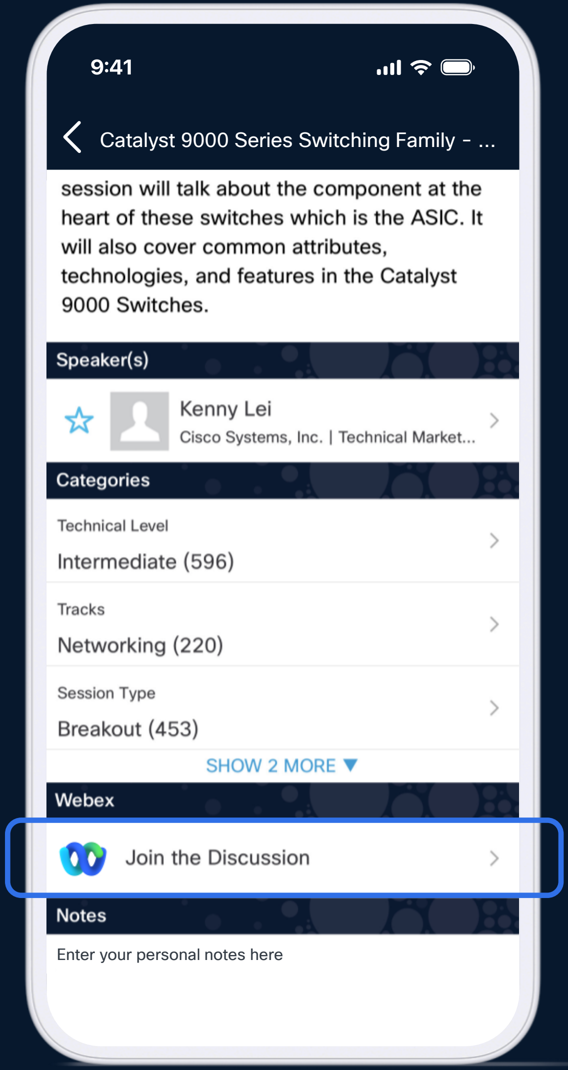
Questions?

Use Webex App to chat with the speaker after the session

How

1. Find this session in the Cisco Events App
2. Click “Join the Discussion”
3. Install the Webex App or go directly to the Webex space
4. Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until February 27, 2026.



Agenda

01 AI on the Factory Floor

02 When AI Meets the Network

03 Vision Systems Deep Dive

04 Security Without Slowing Production

05 What about mobility?

06 Key Takeaways

Goal: Translate AI use cases into concrete network designs

Do not edit
How to change the design

What are your AI use cases?

Do not edit
How to change the design

What are your network roadblocks to deploy AI projects?

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Where AI Shows Up on the Factory

AI is already on the factory floor, showing up in a few **repeatable ways**

Machine Vision

Inspecting every product in real-time for defects and quality assurance.

AGVs & AMRs

Autonomous navigation and material transport across the facility.

Predictive Maintenance

Using vibration, acoustics, and thermal data to prevent failures.

Worker Safety

AI-powered monitoring for PPE compliance and hazard alerts.

Production Optimization

Real-time flow analytics and throughput optimization.

Key Takeaway: Each of these workloads places very different demands on the network (Bandwidth vs. Latency vs. Mobility).

From Sensors to Action on the Factory Floor

Control loops & learning loops

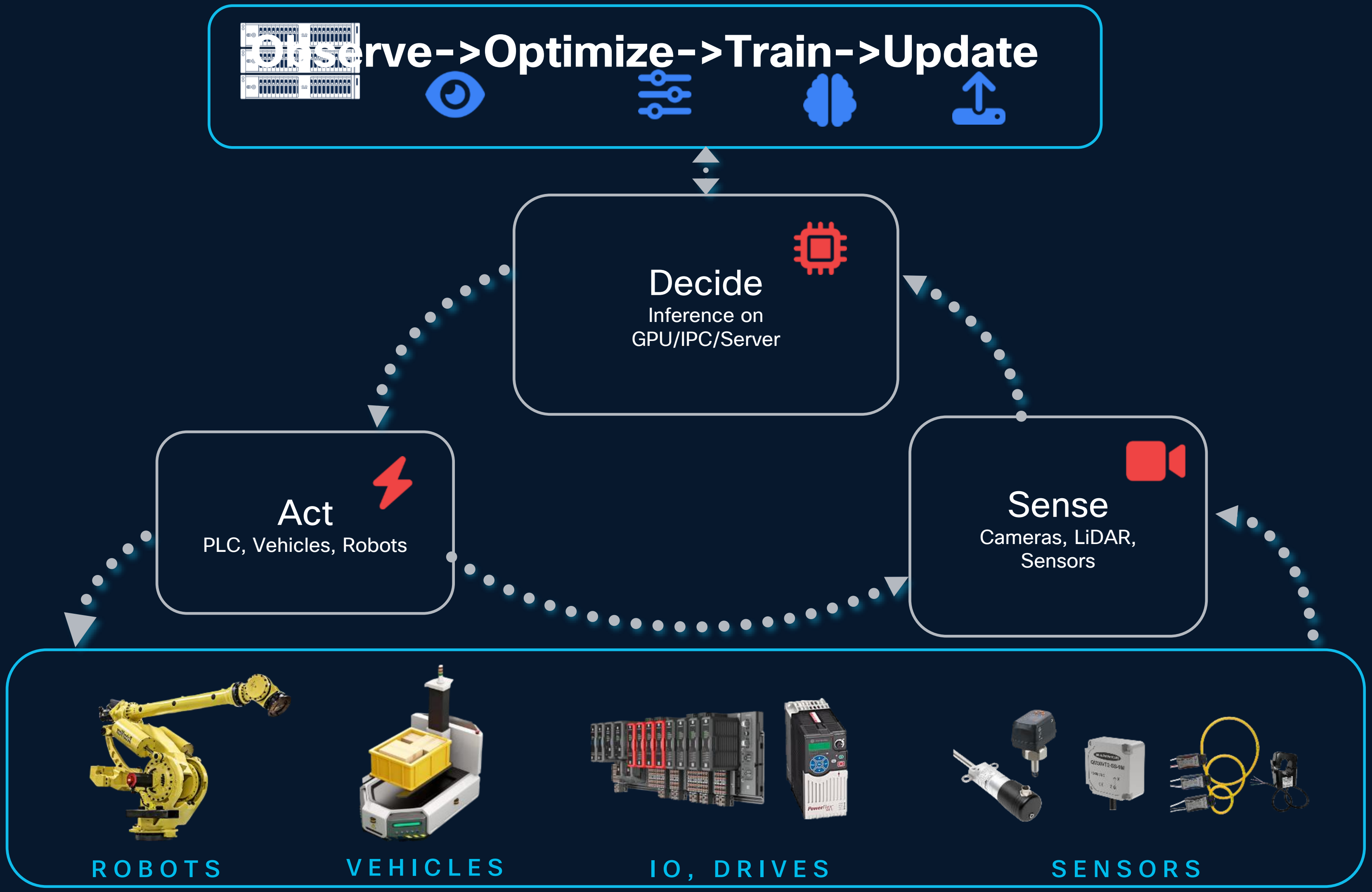
Learning & Optimization

Loop

Real Time

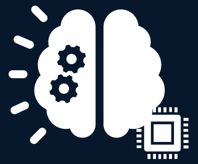
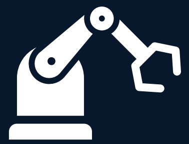
Decision Loop

Physical components



Industrial AI decision loops

Who produces data, where decisions happen, and what acts on the physical world

	Sense	**Decide**	**Act**
Vision	Camera	GPU, IPC	PLC, Robot
AGVs / AMRs	LiDAR, Sensors, Camera	Onboard, Edge	Motion Controller
Worker Safety	Camera	GPU, Edge	Alarm, PLC
Predictive Maintenance	Sensors	Edge, Server	Dashboard
Production Optimization	Sensors, PLC	Server, Cloud	Planner

The network carries every signal in between.

Decision time budgets that shape network design

What happens when a decision arrives too late

Decision in < 10 ms | **Decision in 10–100 ms** | **Decision in seconds+**

- Machine Vision
- AGVs / AMRs
- Connected Worker Safety
- Predictive Maintenance
- Production Optimization & Digital Twins

Consequence if Broken

Inefficiency	Missed Warning	Scrap Product
Delayed Insights	Quality Issues	Collision
Data Gap	Operator Waiting	Unsafe Condition

From Use Cases to Network Design

Translating business needs into engineering constraints

We don't design networks for "Vision" or "AGVs"—we design for the specific behaviors those applications demand. By asking the right questions, we uncover the critical constraints that shape the architecture.

How fast must the decision arrive?

Defines latency budgets, jitter tolerance, and serialization delay limits.

How much data per second?

Determines bandwidth sizing, uplink capacity, and jumbo frame requirements.

What happens if a packet is lost?

Dictates reliability needs: retransmission vs. drop, and redundancy protocols.

Is the asset moving?

Drives roaming requirements, handoff speed, and wireless coverage design.

Where does it get power?

Identifies PoE/PoE++ needs, power budgets, and cable infrastructure.

Design Requirement →	Latency & Jitter	Bandwidth & MTU	Resiliency & QoS	Mobility & Roaming	PoE Budgeting

A Reference Machine Vision Use Case

Design choices you can reuse

Do not edit
How to change the design

How fast does a vision decision need to arrive to avoid scrap?

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What does the camera actually send over the network during inspection?

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What must the network provide to support vision systems?

Do not edit
How to change the design

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Do not edit
How to change the design

In most factories, vision systems run on...

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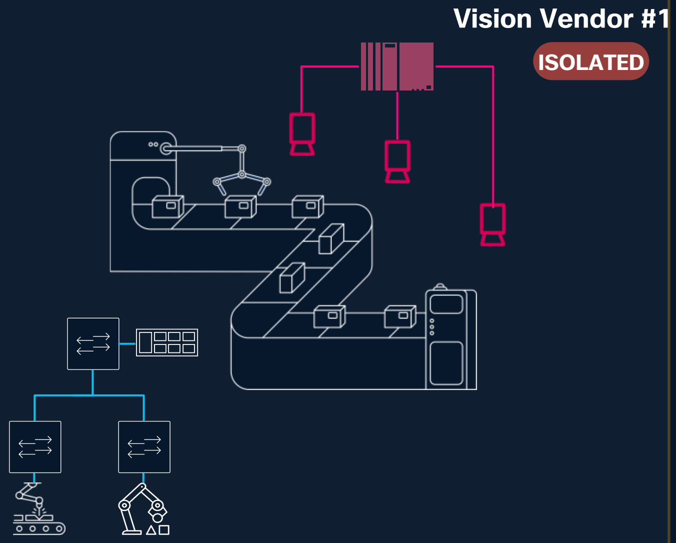
The problem: Vision systems are deployed as islands

From isolated vision islands to integrated cell connectivity

01. Isolated Vision

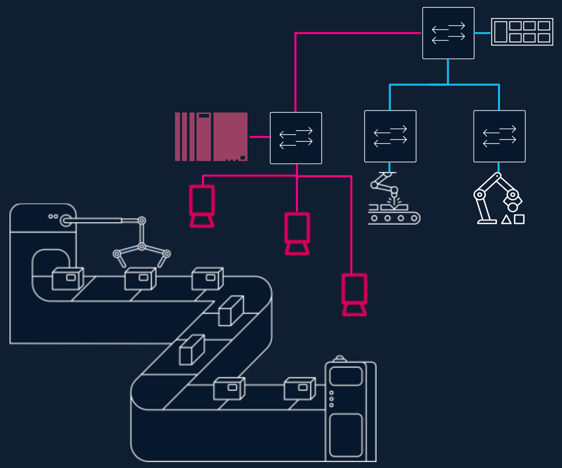
Current State (Legacy)



- Isolated networks create silos & security blind spots
- Messy cabling & unmanaged switches
- Difficult to scale or troubleshoot

02. Converged Network

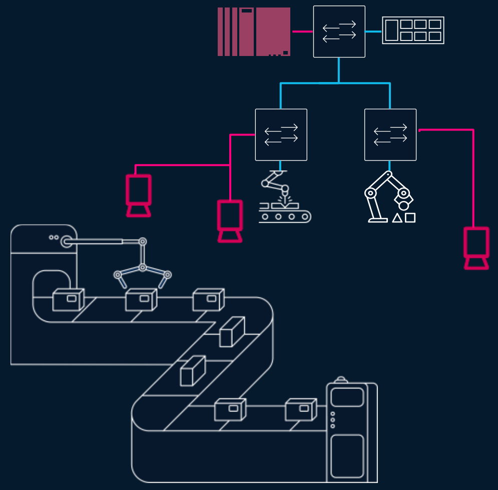
Managed Infrastructure



- Visibility of assets and vulnerabilities
- Centralized management & security policies
- Reduced Cabling (PoE, Data, Timing)

03. Integrated Cell

Next Level Integration



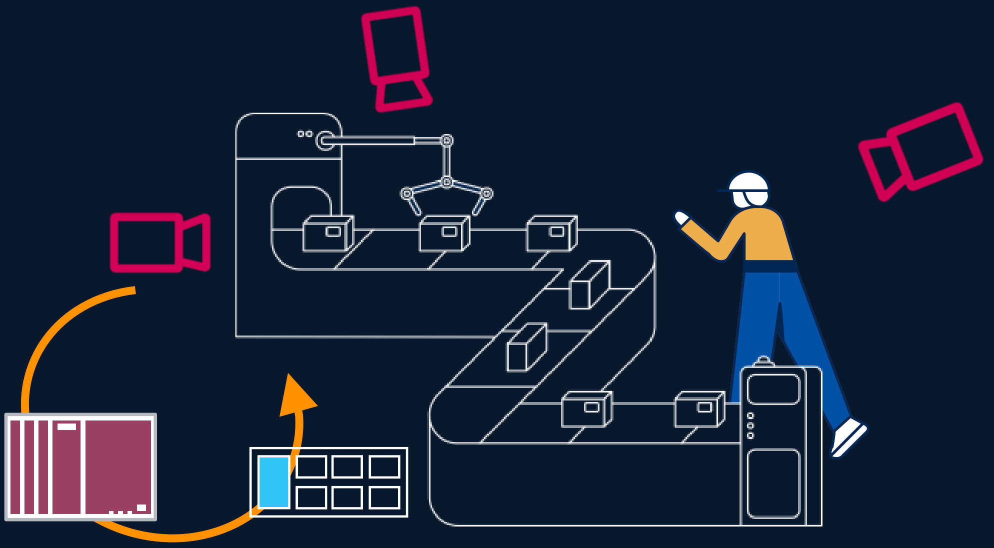
- Switch located **inside** the line/station
- Connectivity driven by physical proximity and constraints
- Reduces duplicated infrastructure

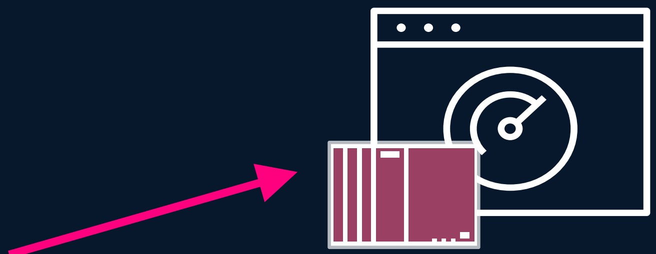
Not All Vision Workloads Stress the Network the Same Way

Very different traffic patterns and infrastructure needs.

② Local Analytics + Historian Offload

- Local decisions
- Periodic uploads
- Power-hungry devices (PoE+/PoE++)





① Process Quality Cameras

Metadata-driven analytics

- Edge intelligence
- Minimal network load
- Power-hungry devices (PoE+/PoE++)

③ Centralized Vision Analytics

Image transfer over the network

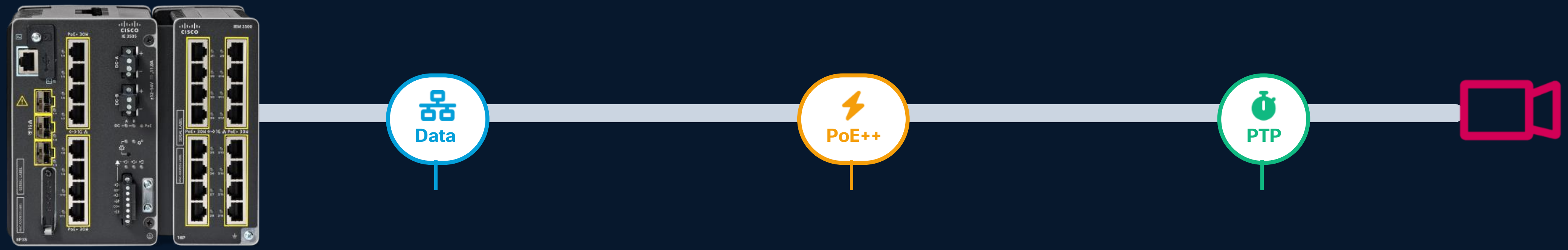
- High bandwidth
- Tight timing sensitivity
- Network becomes critical path

Design for the use case

Dimension	Process Quality Metadata-Driven	Local Analytics Historian Offload	Centralized Vision Analytics
Time Sensitivity	ms – tens of ms (Local Decision)	ms – 100 ms (Local + Delayed Upload)	**Critical Path** (Network in Decision Loop)
Data Volume	Low (KB)	Medium (MB)	High (GB/stream)
Traffic Shape	Small, event-driven	Periodic bursts	Continuous / Bursty
Data Path	GPU Onboard	Onboard + Server	Network → Compute
Endpoint Needs	PoE++	PoE++	PoE+ / High Speed
Network Failure Impact	! **Retransmissions**	! **Retry Backup**	**Failed Inspection**

Why Ethernet, PoE, and PTP Enable Vision Systems

Power, data, and timing over a single cable



Single Cable Integration

Combines Data, Power (PoE/PoE++), and PTP timing on one link.

Predictable Reach

Standard 100m reach per link enables scalable, flexible architecture.

Trigger Coordination

Deterministic triggering at scale using Precision Time Protocol (PTP).

Lower Install Cost

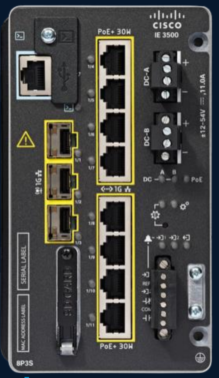
Faster line changes and simplified cabling infrastructure.

No Local Power Required

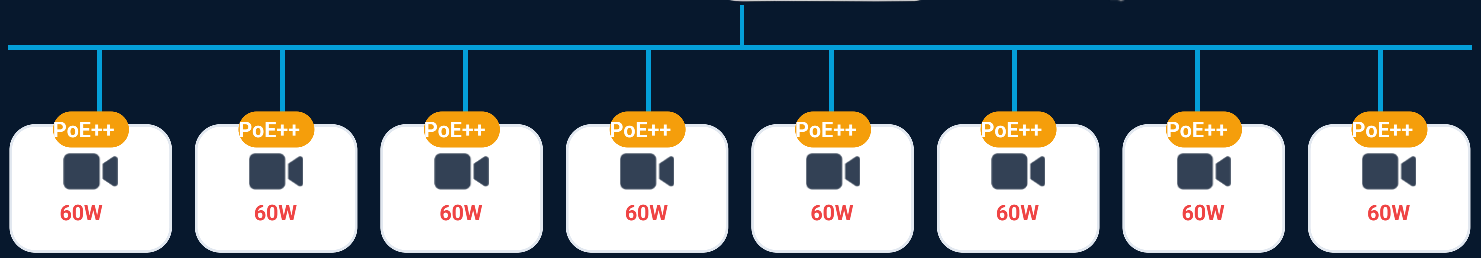
Centralized power control and recovery removes need for local outlets.

PoE in Practice: Devices, Draw, and Real Budgets

Can I power 8x60W cameras?



480W



Total Potential Draw: 8 x 60W = 480W

⚠ PSU rating ≠ available PoE budget.
You must subtract switch base power and module consumption first.

Power Standards

- ✓ Type 1 (PoE / IEEE 802.3af) up to 15.4W (Small sensors)
- ✓ Type 2 (PoE+ / IEEE 802.3at) up to 30W(Standard GigE cameras)

High Power

- ✓ Type 3 (4-pair PoE++ / IEEE 802.3bt Type 3) up to 60W (Smart camera / LiDAR (some))
- ✓ Type 4 (4-pair PoE++ / IEEE 802.3bt Type 4) up to 90W (High-end cameras, compute-heavy endpoints)

PoE Power Budget Calculation: What You Must Account For

PSU Rating
Total power supply input (e.g., 240W or 480W)

−

Base Switch
Internal power consumption of the base unit
2

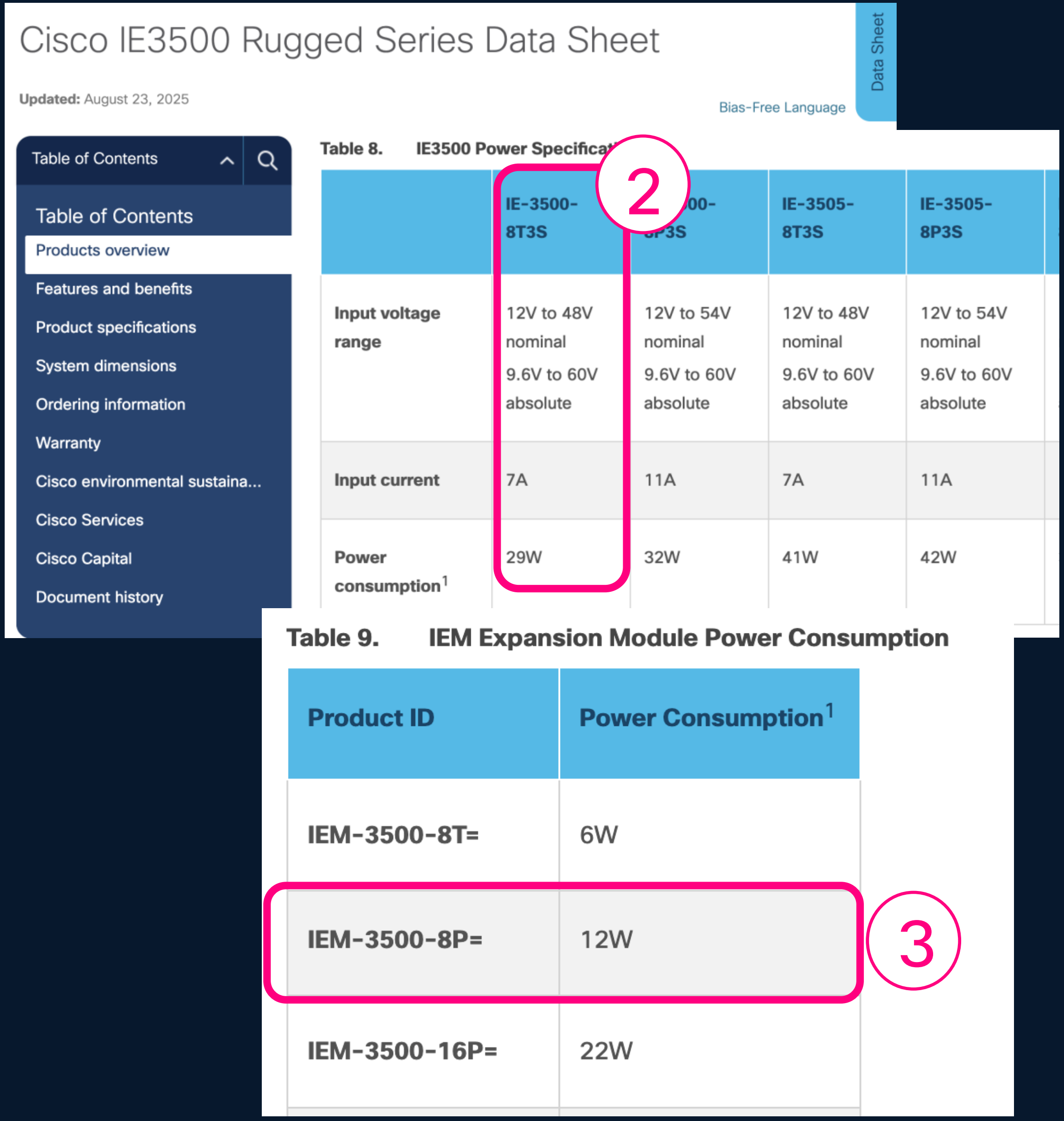
−

Exp. Module
Power draw of installed expansion modules
3

Available Budget
Real usable PoE power for endpoints

Endpoint Requirements
Check **Max PoE draw** per device, not average. Use datasheet values for worst-case planning.

Port Capabilities
Confirm per-port class support (PoE/PoE+/4PPoE) matches device needs (e.g., Type 4 90W).



Cisco IE3500 Rugged Series Data Sheet

Data Sheet

Updated: August 23, 2025

Bias-Free Language

Table of Contents

Table 8. IE3500 Power Specificat

	IE-3500-8T3S	[illegible]00-[illegible]P3S	IE-3505-8T3S	IE-3505-8P3S
Input voltage range	12V to 48V nominal 9.6V to 60V absolute	12V to 54V nominal 9.6V to 60V absolute	12V to 48V nominal 9.6V to 60V absolute	12V to 54V nominal 9.6V to 60V absolute
Input current	7A	11A	7A	11A
Power consumption[1]	29W	32W	41W	42W

2

Table 9. IEM Expansion Module Power Consumption

Product ID	Power Consumption[1]
IEM-3500-8T=	6W
IEM-3500-8P=	12W
IEM-3500-16P=	22W

3

How Many 60W Cameras Can I Connect?

480W - 32W - 12W = **436W** → PoE Budget

- 480W → PSU
- 32W → Base Module
- 12W → Expansion Module

436W x 85% = **370W** → Usable PoE budget

- 436W → PoE Budget
- 85% → Allow for headroom

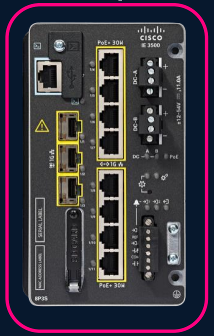
370W / 60W = **6 Cameras**

- 60W → Max PoE draft

PoE Features That Matter – and How You Configure Them

Global Budget Control

Switch-wide power limitation

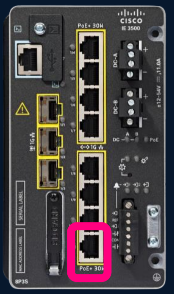


- Limits the total PoE power available from PSU to prevent power source overdraw

```
Switch(config)#power inline wattage max <watts>
! Example: Limit total POE to 370W
Switch(config)#power inline wattage max 370
```

Per-Port Configuration

Granular control and prioritization

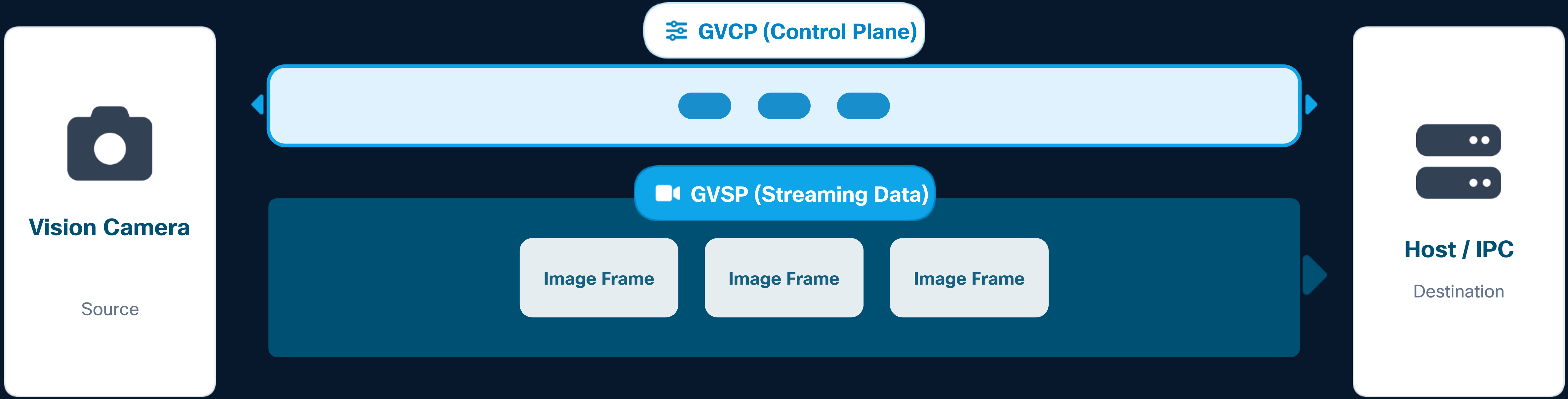


- Control PoE per port (i.e. disable , auto detect)
- Prevent one device from starving the rest
- Enable perpetual PoE for power during reboots and quick start
- Reserves power

```
Switch(config)#interfaceGigabitEthernet1/0/2
Switch(config-if)#power inline auto (never/static)
Switch(config-if)#power inline consumption wattage
Switch(config-if)#power inline police action errdisable
! Fast PoE
Switch(config-if)#power inline port poe-ha
! Keep power on during switch reload
Switch(config-if)#power inline port perpetual-poe-ha
```

GigE Vision Traffic Patterns (What the Network Sees)

Two Traffic Patterns



Control Plane (GVCP)

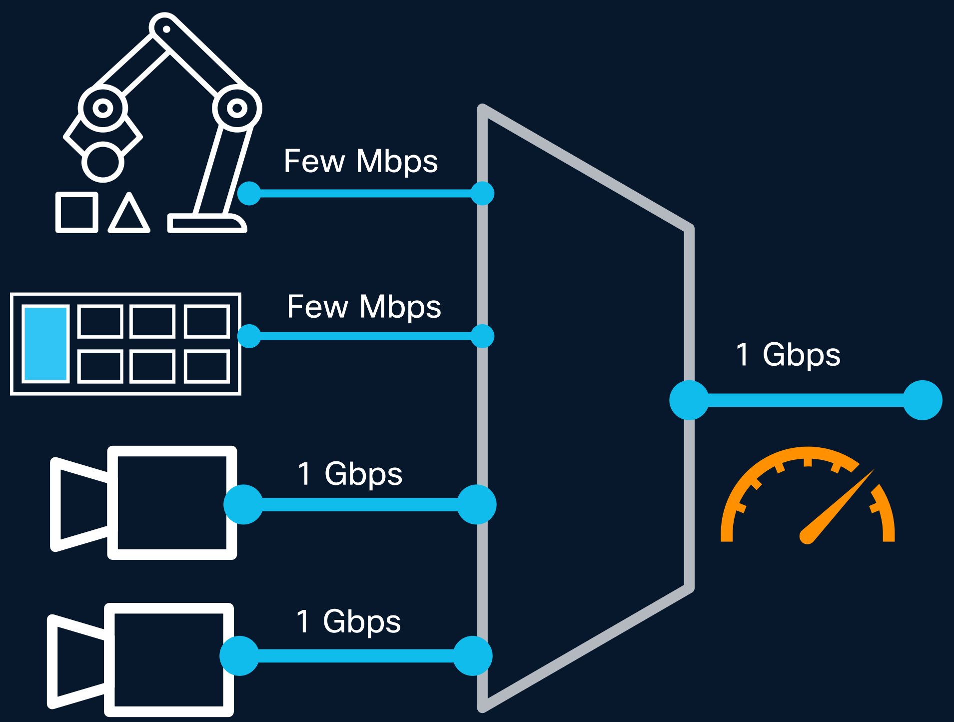
- Low Bandwidth utilization
- Highly Latency-Sensitive (missed packets = missed triggers)
- Camera config & triggering
- Small UDP frames

Data Plane (GVSP)

- High Bandwidth (Images)
- Loss-Sensitive (Drop = Retransmissions & Bad Image)
- Continuous or Bursty traffic
- Large frames (Jumbo preferred)

Bandwidth and delay budgets

When cameras turn uplinks into bottlenecks



Uplink Utilization Target ≤ 70%

0% 100%

Bandwidth Planning Rules

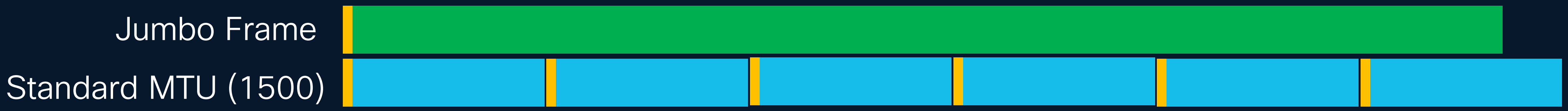
- **1 Gbps uplinks** are often insufficient once vision is added. IE3500/IE9300 support 2.5G & 10G uplinks.
- Plan uplinks for **≤ 70% sustained utilization** to absorb bursts.
- Use **≤ 50%** when mixing vision with critical PLC control (PROFINET, CIP)

Why this matters (The Hidden Costs)

Bursty Traffic Patterns	**Serialization Delay**
Non-linear Queue Growth	**Tail Latency Explosion**

Key Insight: Average bandwidth is misleading. Vision traffic arrives in clumps (bursts). If the uplink is >70% utilized, these bursts fill queues instantly, causing jitter for control traffic.

One Image, Many Packets – Why MTU Size Matters



With Standard MTU:

+ More packets
+ More headers
+ More processing per image

Same image data – different network cost

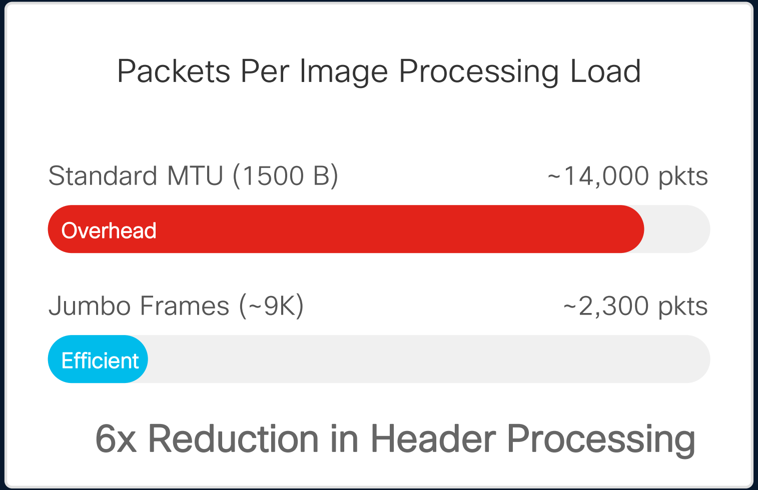
Measured Impact of Jumbo Frames (Lab Results)

Same image, same link speed, different MTU

Metric	Jumbo Frames (~9000 B)	Standard MTU (1500 B)
Packets per image	**~2,300**	**~14,000**
Headers processed	Low	~6× higher
Total payload sent	~19.5 MB	~20.1 MB (overhead)
Transmit time @ 1 Gb/s (theoretical)	**~165 ms**	**~177 ms**
Measured transmit time (lab)	~166 ms	~183 ms
Processing load (NIC / switch)	Lower	Significantly higher
Overall efficiency	Baseline	~6–7% slower

Key Takeaway

Jumbo frames significantly reduce CPU overhead and improve predictability by reducing the total number of packets processed by **~83%** per image.



What Happens When Control Traffic Meets Jumbo Frames?

Efficiency isn't the same as predictability

Jumbo frame (≈9 KB)

Time T: Transmission Start
Large 9KB jumbo frame begins serialization, occupying the link for ~72μs at 1Gbps.

Time T+1: Critical Event
High-priority control packet arrives but cannot interrupt the frame on the wire.
(≈100 bytes)

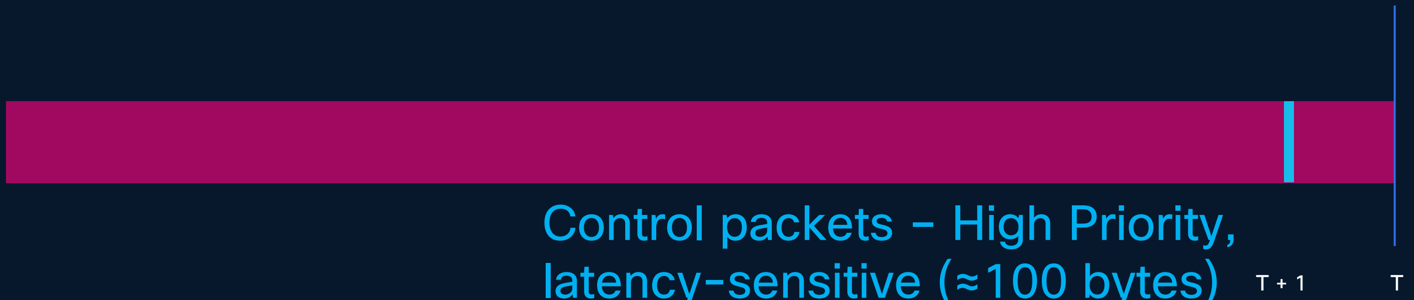
Even at highest priority, transmission cannot interrupt a frame
If a jumbo frame starts transmitting first, control traffic must wait

Jumbo frame serialization delay (1G): ~72 μs!!! And This delay compounds across multiple hops

How Frame Preemption Changes the Equation

Frame preemption (802.1Qbu)

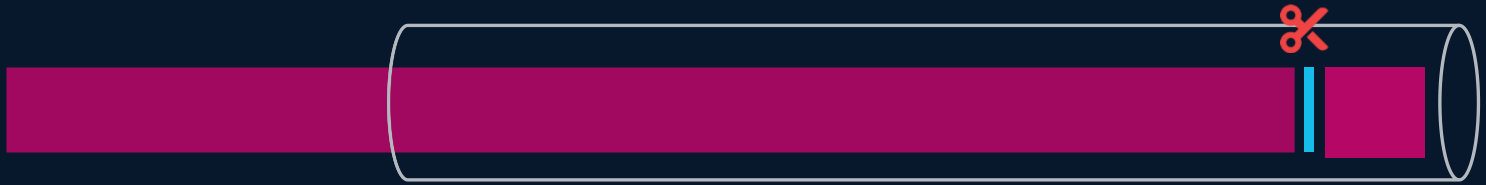
Jumbo frame (≈9 KB)



Control packets – High Priority, latency-sensitive (≈100 bytes)

Prioritize critical traffic

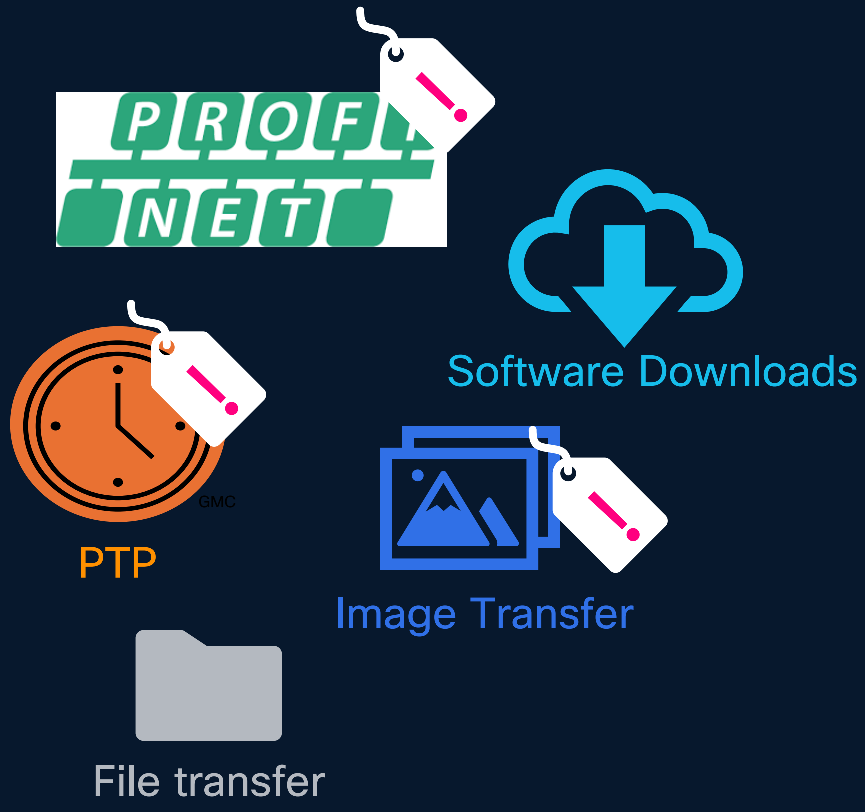
Time-sensitive data preempts best effort transmission



Ensure predictable performance
Configure with easy CLI: prioritize CIP traffic + configure link-to-link for preemption
Serialization delay drops from ~72 μs → ~few μs

Preemption Solves Control – What About Everything Else?

Preempting control traffic is necessary – but not sufficient



- Frame preemption protects time-critical control
- Vision traffic is high-value and expensive to retransmit
- Background traffic (updates, backups) still exists

Without classification, critical vision traffic competes directly with background file transfers and updates.

Preemption handles the "Express Lane", but who manages the highway?

Identify what matters before deciding how to treat it

QoS - Classification and marking are the foundation of deterministic behavior

Identify Traffic

Time-Critical Control (Class 1)

PTP · IO · GVCP

Latency-critical, small frames

High-Bandwidth Vision (Class 2)

GVSP · Stream

Loss-sensitive, Jumbo Frames

Other Traffic / Best Effort

Data · Mgmt

Everything else

Match Criteria

L2 / L3 / L4 Inspection

- Match Ethertype (PN)
- Match UDP Port 319/320
- Match UDP Port 2222

L3 / L4 Inspection

- Match UDP Port 3956
- Match Source IP
- Match DSCP (if trusted)

Default Rule

- Match Any
- *No specific match*

Marked QoS Group

QoS Group 1

Strict Priority / Can preempt other traffic

QoS Group 2

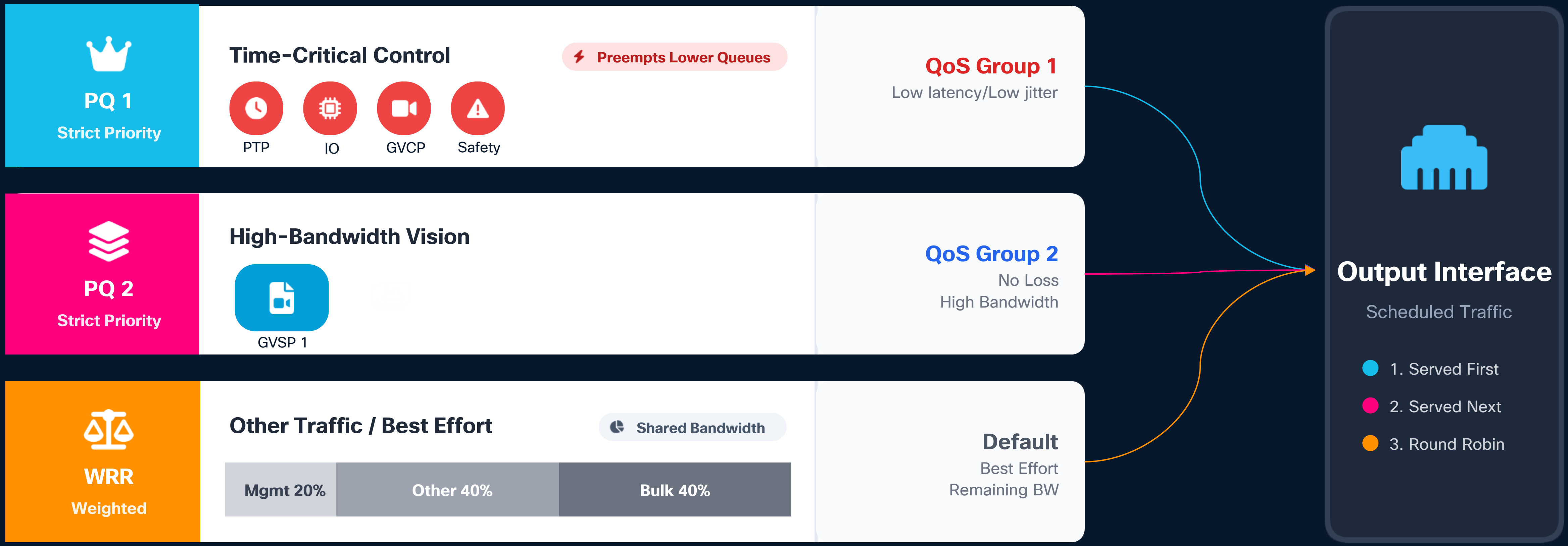
Protected Vision Queue

Default

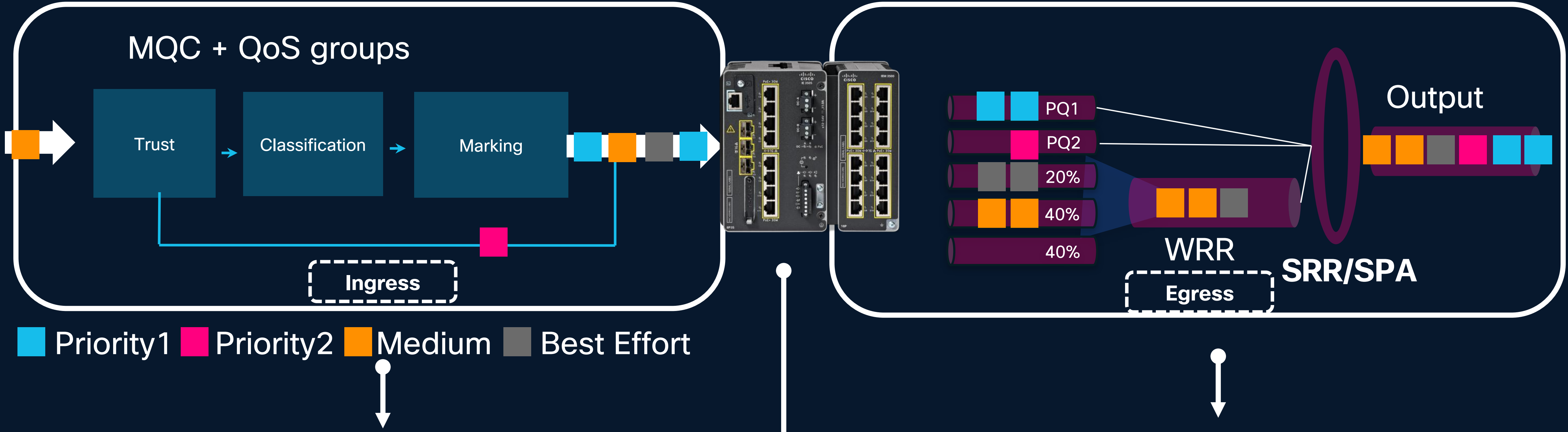
Best Effort

- **PROFINET RT - CIP I/O - PTP**
  - *Latency-critical, deterministic*
  - *Small frames, low volume*
- **GVCP**
  - *Control-plane for vision*
  - *Small frames, low volume*
  - *Latency-critical*
- **GVSP**
  - *High-bandwidth, loss-sensitive*

Once marked, traffic gets treated differently



QoS in Action: From Ingress Decisions to Egress Scheduling



Ingress: *Decide what this traffic is*

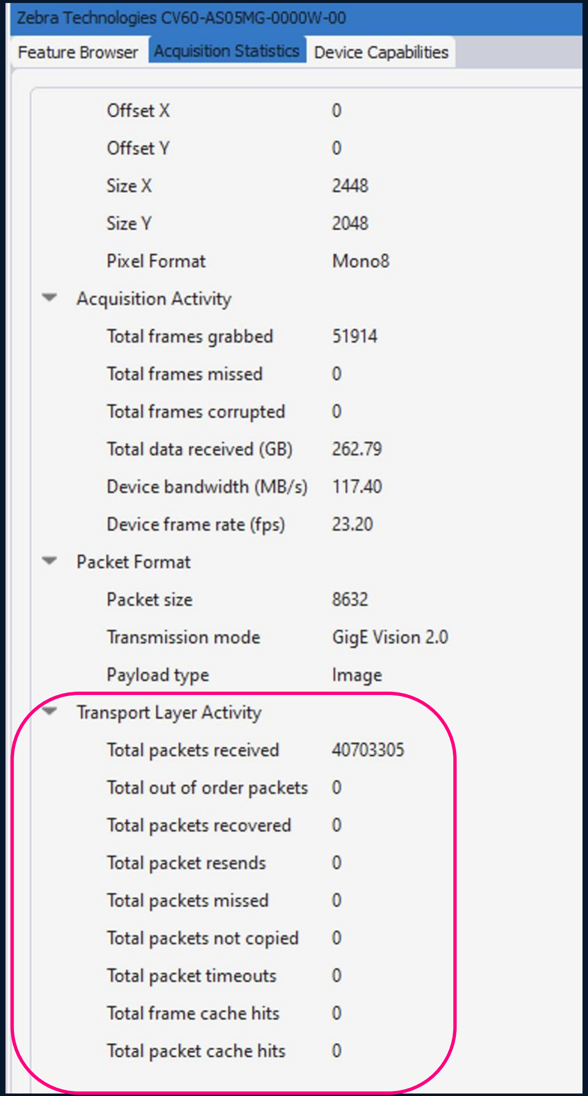
Egress: *Who gets served first, and how mu*

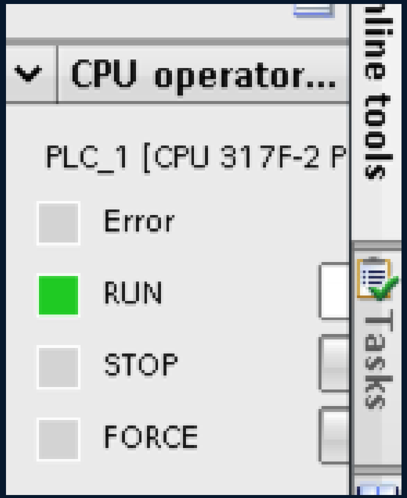
Switch: *Hardware enforces the rules*

Legend:
WRR = Weighted Round Robin
SPA: Shared Port Adapter
SRR: Shaped Round Robin
PQ1, PQ2: Priority Queue 1, Priority Queue 2

CVD Proven: Zero Packet Loss, Stable Control

Tested under congestion in uplink in a converged network





Safe PLC remains in RUN – no jitter-
No faults

Statistics for a single camera
- 0 packets missed
- **0 retransmissions**
- >4M packets received
- ~117 MB/s sustained **(936 Mbps)**

- Vision traffic is **protected** without starving control
- **No retransmissions** → no wasted bandwidth
- **Deterministic behavior** maintained under real load

PTP Benefits for Machine Vision Use Cases

Precise time synchronization for scalable, high-speed inspection systems

Multi-camera inspection

All cameras capture the *same instant* using timestamped triggers

High-speed motion

Images align precisely with motion position, encoder counts, or robot states

Distributed vision systems

One multicast scheduled action replaces trigger wires.

Traceability & digital twin

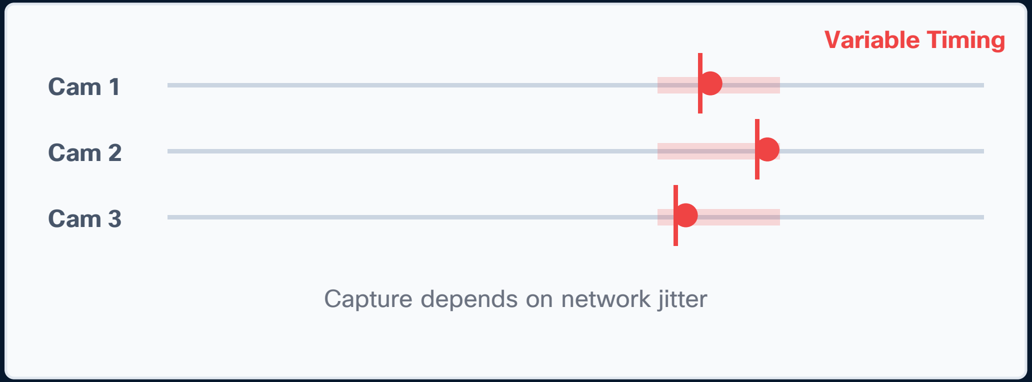
Every image is timestamped for MES, historian, genealogy, and root-cause analysis.

PTP Enables Deterministic Vision Triggers

A shared timebase turns network timing into predictable capture

Immediate Action

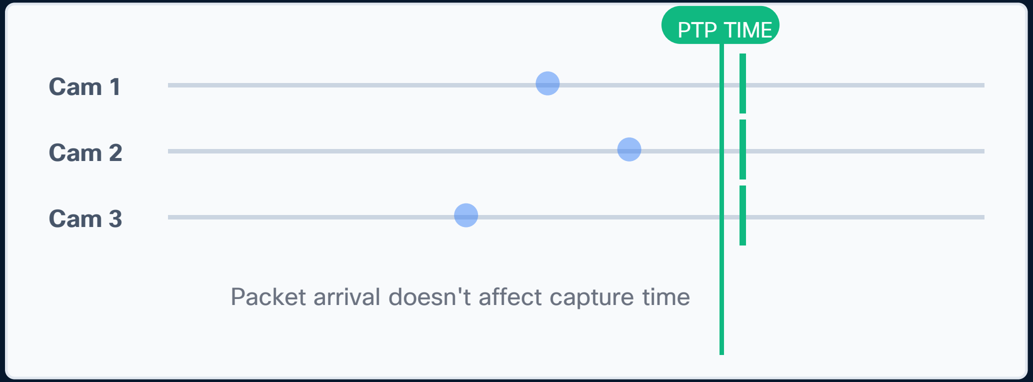
Trigger on packet arrival



- ✕ Timing varies with latency & jitter
- ✕ Cameras fire at different moments
- ℹ Suitable for low-speed / uncorrelated capture

Scheduled Action (PTP)

Trigger at precise timestamp

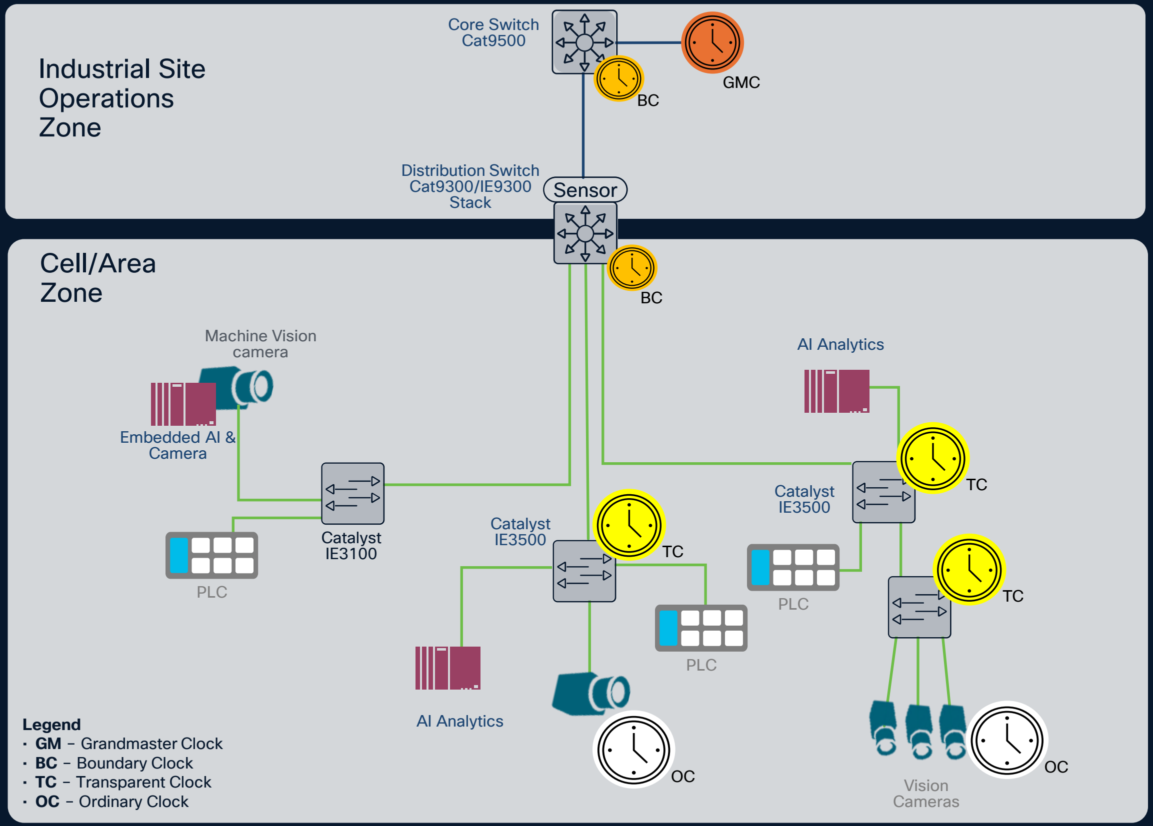


- ✓ Independent of network jitter
- ✓ All cameras expose at same instant
- ✓ Enables high-speed multi-camera inspection

PTP decouples “when a packet arrives” from “when an image is captured.”

PTP Architecture for Industrial Automation

How time is distributed, protected, and preserved across the industrial network



What this enables

Single precise time domain across cameras, PLCs, and motion control

Hardware-assisted timing (BC/TC) eliminates jitter accumulation

Deterministic synchronization across Cell/Area and Site zones

Scalable multi-camera deployments without hardwired triggers

Design Considerations

All network elements in path must support PTP (BC or TC mode)

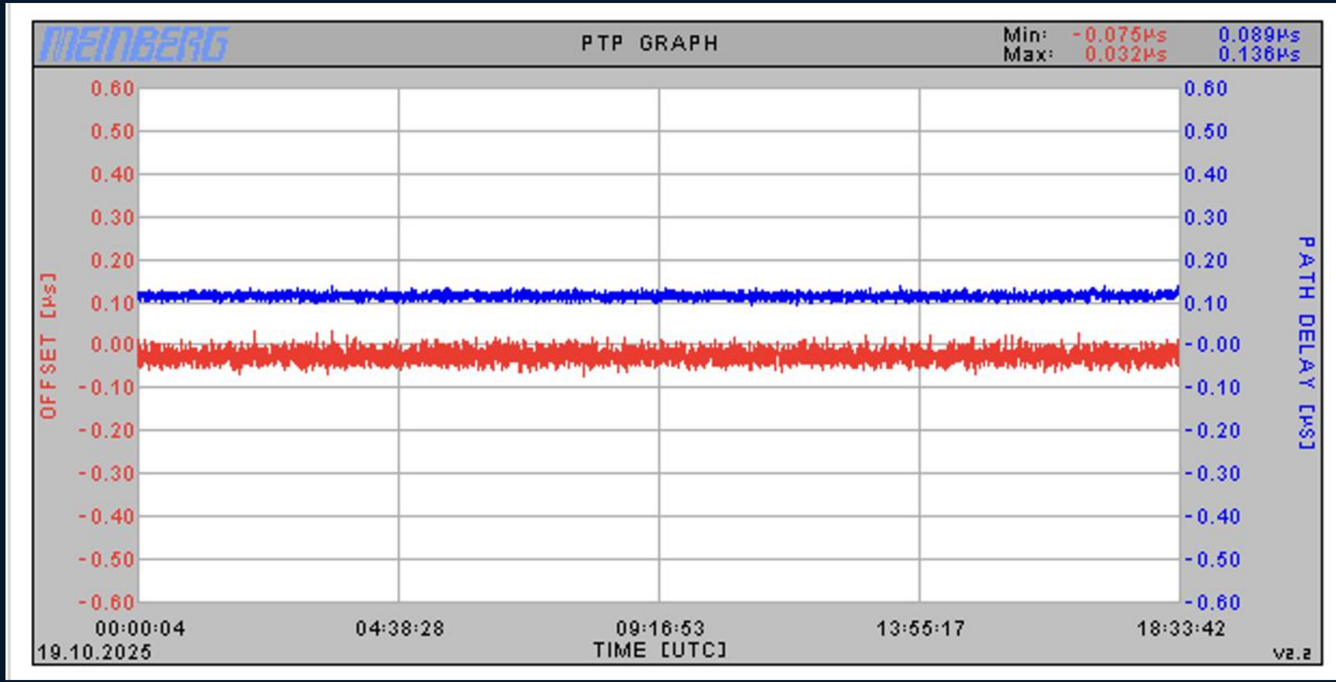
Congestion must still be managed using QoS for stability

PTP not currently supported on 2.5G interfaces (check specific hardware)

PTP interop with features varies by platform

PTP Stability Under Network Load

Measured timing accuracy during congestion scenarios



*Topology: E2E PTP, 2 Boundary Clocks, 3 Transparent Clocks.

- **Offset (µs)**
  Estimated time error to the current PTP master (E2E).
  Driven by boundary clock servo accuracy
  Peak-to-peak: 0.11 µs
- **Mean Path Delay (µs)**
  One-way propagation delay to the current PTP master.
  Dominated by physical link distance; transparent clocks correct residence time.
  Average: ~0.12 µs

Choosing the Right Resilient Topology for Machine Vision

Balancing recovery time and bandwidth for vision workloads

Avoid

Control-Optimized (1G)

PRP / HSR / DLR

1G Only | No Jumbo

Zero-loss recovery but limited bandwidth (1G max) and small frame sizes (≤1500B).

0-3 ms

When to use

Ultra-critical motion control. ***Not for high-bandwidth GVSP video streams.***

Spanning Tree

No config needed

RSTP / MSTP

Any Speed

Slower convergence.. Topology changes cause traffic floods.

~1000 ms

When to use

Simplicity, no config needed.
MSTP allows for interop – Standards based

Rings

Balanced Recovery

MRP

Standards Based.

~30 ms

REP

Supports 10G rings. Fast convergence. Flexible segmentation.

<250 ms

When to use

Daisy-chain layouts, conveyor lines, long distances where cabling is expensive.

Redundant Stars

Scalable Bandwidth

Redundant Star + LACP

10G+ | Jumbo OK

Port-channels aggregate bandwidth. Full jumbo frame support. Simple troubleshooting.

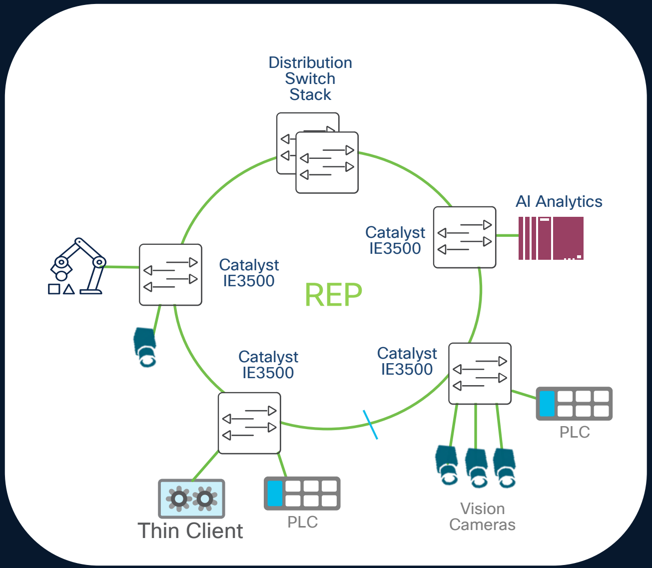
100-300 ms

When to use

Multi-camera high-speed vision. *When bandwidth scalability is the priority.*

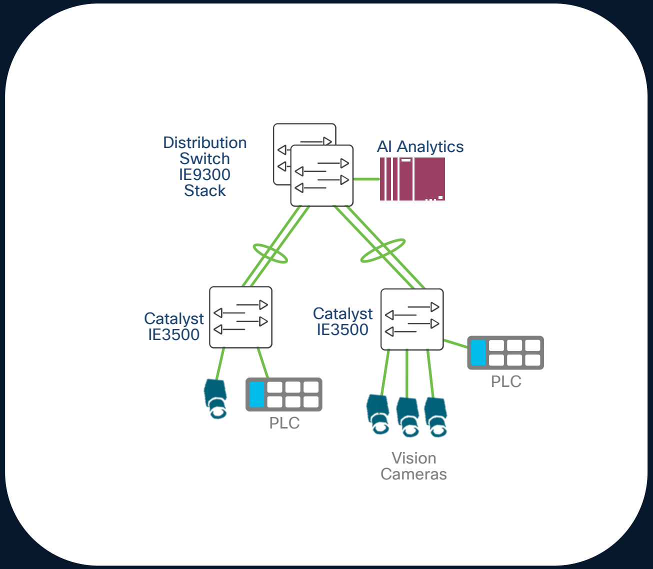
Designing for Bandwidth and Redundancy

10G Ring
REP Redundancy



- Fast recovery
- 10G uplinks support
- Redundant path
- Efficient cabling

Star + Port-Channel
Redundancy that scales



- Aggregated uplinks
- 10G uplinks support
- Predictable traffic flow (Not blocking)

Key Design Takeaways for Machine Vision Networks

Practical guidance for robust industrial AI deployments

Design uplinks for **worst-case aggregate camera bandwidth**, not nominal frame rates

Enable **jumbo frames for GVSP** and keep MTU consistent end-to-end

Engineer PoE budgets (802.3bt Type 3/4) with headroom. Use **Perpetual/Fast PoE** to maintain camera power during switch reboots.

Apply **QoS to separate control, vision control, and vision data**

Use **frame preemption** to protect time-critical control without blocking large frames

Place cameras and processing close, **minimize hops in the vision path**

Isolate vision traffic with **dedicated VLANs**

Use **redundancy that scales bandwidth**

Use PTP (BC/TC modes) for **deterministic multi-camera triggers.**

What about security?

A Quick Look at Security

Securing Machine Vision Networks

Comprehensive defense-in-depth for industrial vision systems

Port Hardening
Harden access ports for cameras and IPCs

Network Isolation
Isolate vision systems with dedicated VLANs for cameras, processing, and management

TrustSec Policies
Apply TrustSec policies aligned to camera / server communication flows

Secure Remote Access
Enable secure remote access with SEA for maintenance and support operations

Visibility & Detection
Gain visibility with Cisco Cyber Vision for assets, flows, and anomalies

Embedded Security
No additional security appliances required, all capabilities are built into the network infrastructure.

Zero Trust

Segmentation	**Dedicated VLANs**
Policy	**TrustSec SGT**
Access	**Port Hardening**
Visibility	**Cyber Vision**
Remote Access	**SEA**

Where should the intelligence live?

Where do you expect most industrial AI workloads to run in your environment?

Compute Placement: Application Needs, Orchestration, Scale

Network design determines whether that choice succeeds

Closest to the edge

Onboard / Embedded Machine Level

- Fully local decisions
- Highly distributed
- Limited compute headroom
- Tightly coupled to machine lifecycle

IPC at the Access Level

- Simple, single-purpose workloads
- Limited compute scalability
- OS lifecycle hard to manage at scale

Rugged Cell Compute Cell Level

- Reduced HW footprint
- Easier updates than IPC
- Limited HA options
- Orchestration complexity across cells

Factory Compute Closet Area / Zone

- Supports clustering and scaling
- Space, cooling required
- Network resiliency must be designed

Closest to DC

Factory Server Room Core / Site

- Full HA capabilities
- Mature orchestration and tooling
- High network dependency
- Requires OT/IT coordination

Centralized compute simplifies orchestration, patching, monitoring, and integration with IT platforms

Enables modern use cases (AI, analytics)

Moving workloads away from the edge increases network dependencies:

Vision (Control Loop)
→ Requires high bandwidth, low latency, zero loss end-to-end

vPLC / Control
→ Requires ultra-low jitter, high resiliency, Layer 2 adjacency

HMI / Predictive Maintenance
→ More flexibility, less stringent requirements (High availability focus)

Wireless as an AI Enabler on the Factory Floor

Wireless + AI on the factory floor

Fast wireless is not enough for real-time perception, decisions, and safety

- AI on moving assets depends on **predictable roaming** and stable connectivity, not peak throughput
- Perception and localization rely on **consistent latency** and reliable uplink for camera, LiDAR, and telemetry data
- Network behavior directly impacts **safety, accuracy, and throughput** in real-time AI loops

To keep AI decision loops stable over wireless, the network must provide:

- **Deterministic roaming** with fast handoff times (ms)
- **Ultra-low packet loss** for safety and control traffic
- **Sufficient bandwidth** for multiple camera and LiDAR streams
- **Traffic prioritization** where safety and control override best-effort data

Mobility use case – AI-driven AGVs / AMRs

Safety stays local. Coordination crosses the network

Local / Onboard Loops

Reflex & Safety

- Emergency stop and collision avoidance
- Localization (SLAM) and motion control

(Hard real-time, must not depend on the network)

Network-Assisted Loops

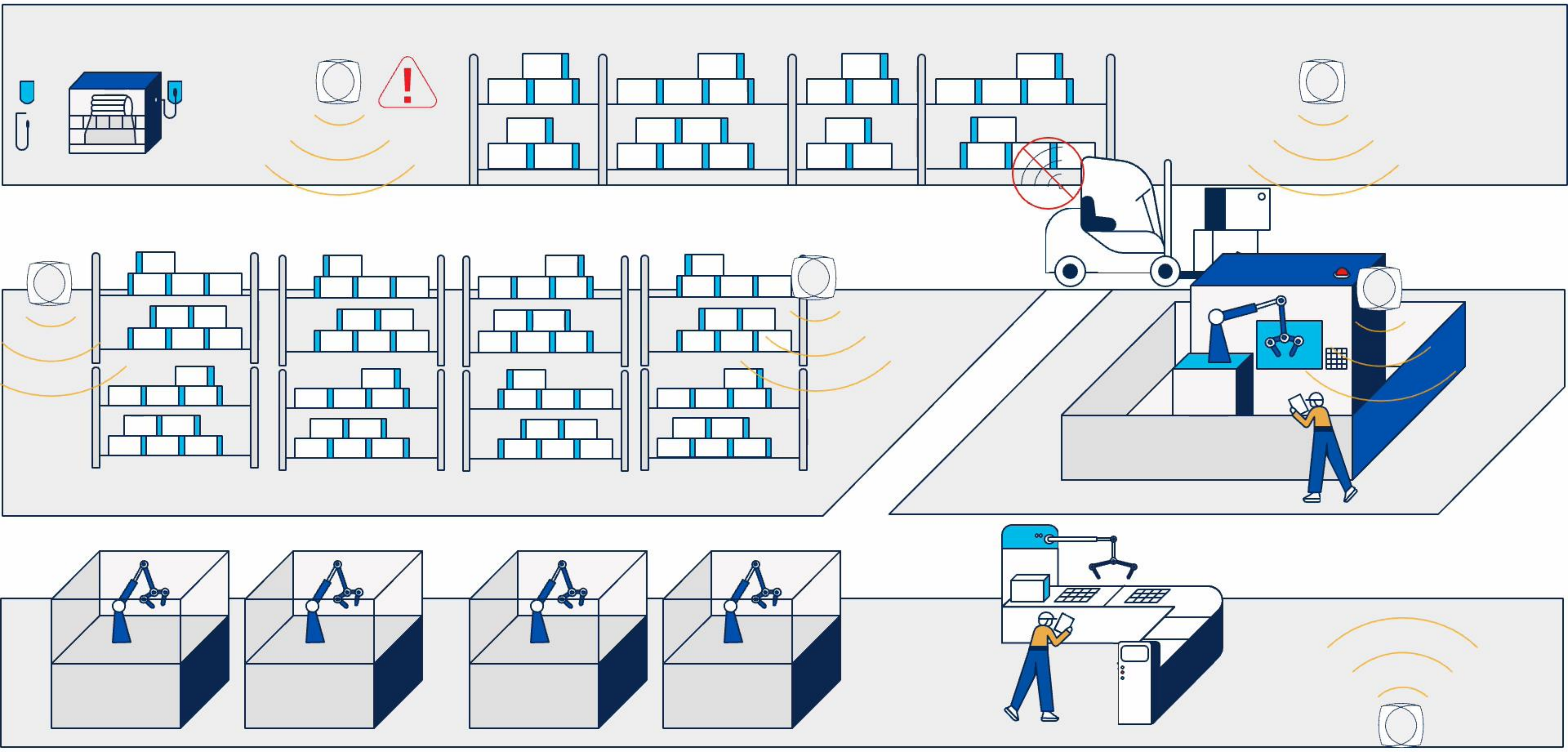
Coordination & Planning

- Fleet coordination and traffic management
- Telemetry, awareness, and optimization

(Time-bounded, reliability-sensitive, network-dependent)

When network guarantees degrade (Cause → System Impact)

Cause	Impact	Cause	Impact
Latency variation	→ localization drift	Packet loss	→ incomplete context vehicle stops
Uplink congestion	→ dropped metadata	Unpredictable roaming	→ Coordination instability



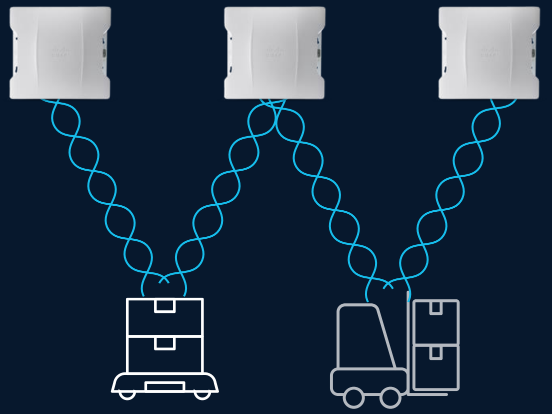
IF CONNECTIVITY DROPS, OPERATIONS PAUSE

Introducing Wi-Fi and URWB unified infrastructure

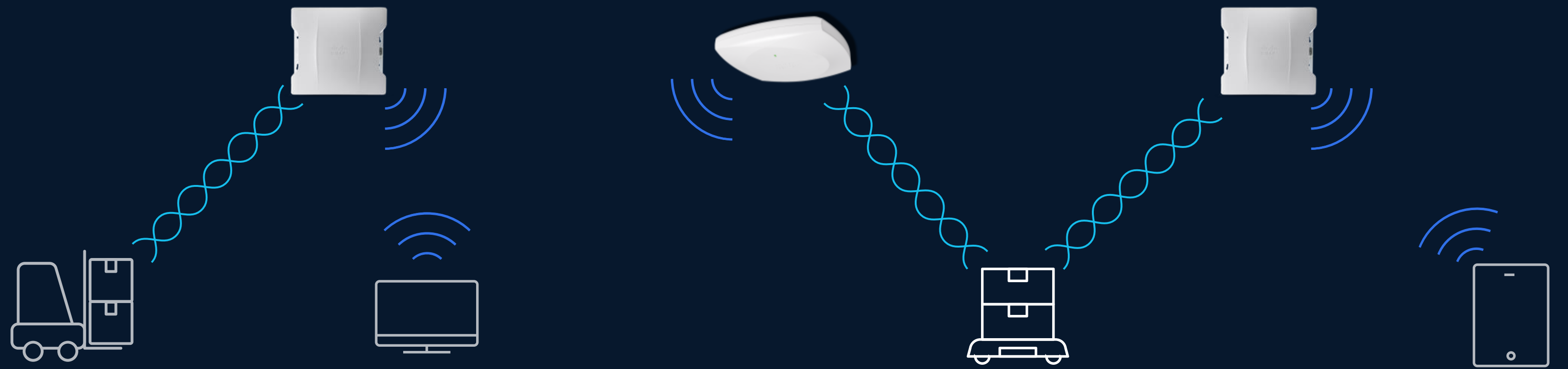
Before

Wi-Fi
Access
Network

Industrial
Wireless
Network

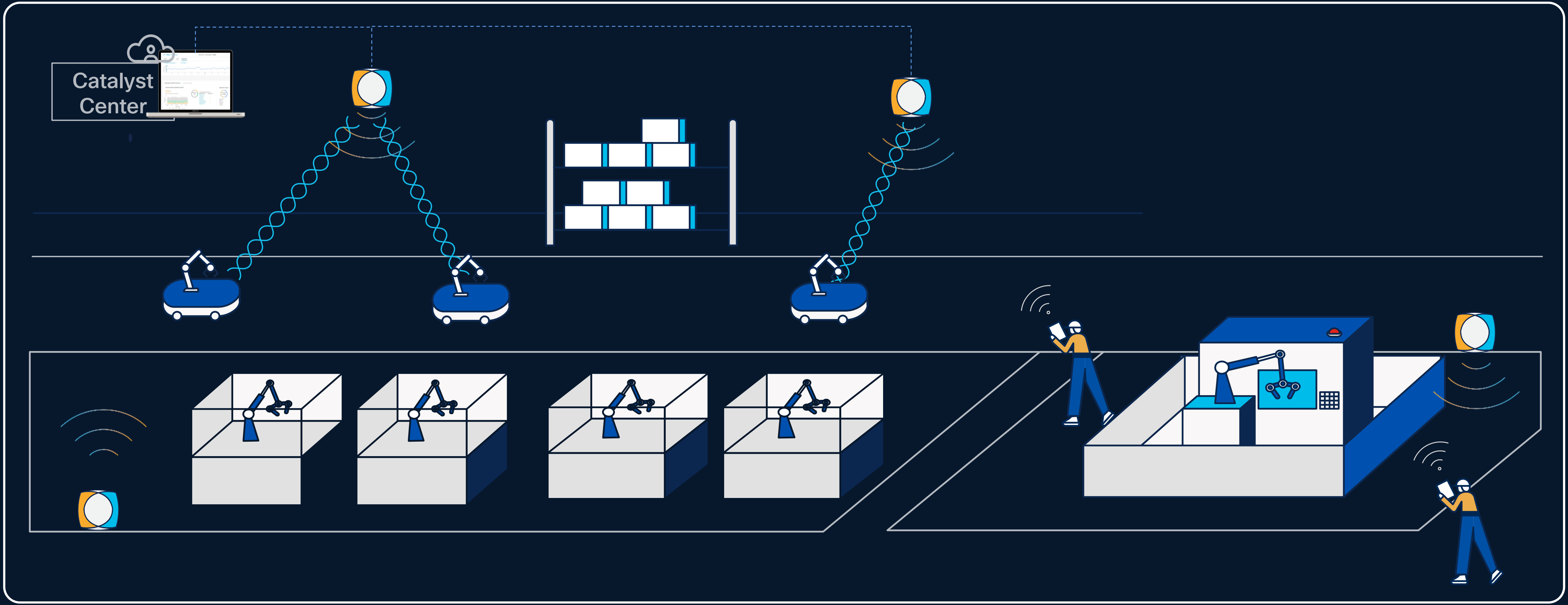


Now



Unified Wireless Infrastructure

Seamless roaming for AGV/AMR along with WiFi connectivity for users/scanners/Torque tools



Ultra-reliable wireless connectivity for AGVs, forklifts and Wi-Fi devices

- ✓ Ultra-reliable connectivity to support PLC communications and Layer 2 Industrial protocols
- ✓ Provide Wi-Fi connectivity to sensors, handheld devices and other Wi-Fi clients on the floor

Closing

Machine Vision Cisco Validated Design

From isolated systems to converged architecture

Reality in Plants Today

Isolated Network Silos
Cameras and vision systems are **added locally**, outside the main industrial network.

Cable + power complexity
Separate cabling and external power supplies **increase cost** and design effort.

Determinism concerns
Fear that shared networks cannot meet real-time vision requirements.

What the CVD Changes

Integrated Infrastructure
Vision becomes part of a secure, automated, and manageable network architecture.

Network-delivered power and timing
High-power (**PoE++**) delivery and time synchronization over the network.

Validated deterministic performance
Network engineered to deliver **microsecond-level latency** for vision traffic.

CVD Benefits: integrated infrastructure, built-in security, cable/power cost reduction

From Questions to Network Design Pillars

Practical guidance for robust industrial AI deployments

Time-Bounded Behavior

Decision timing drives latency & jitter budgets.

Examples:
- QoS scheduling
- TSN mechanisms (where applicable)
- PTP (time alignment, multi-camera sync)

Robustness Under Stress

Bandwidth sizing, QoS, and resilience mechanisms.

Examples:
- QoS under congestion
- Resiliency protocols

Physical Edge Capability

PoE power & mobility

Examples
- PoE / PoE+ / PoE++
- 1G / 2.5G / 5G / 10G ports
- Industrial wireless (Wi-Fi / URWB)

Scalability

Architecture that grows via uplinks & topologies.

Examples
- Uplink capacity
- Resiliency
- Compute Options

Security and Operability

Unified management, proven designs & policies.

Examples
- Visibility
- Segmentation
- Remote Access
- Automation
- Monitoring

AI isn't a magic wand – it's a hungry workload. The factories that win are the ones where the network team and the AI team sit at the same table

Complete your session surveys

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(from 11:30 on Thursday, while supplies last)

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Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs

Visit the On-Demand Library for more sessions at CiscoLive.com/On-Demand

Contact me at:
https://www.linkedin.com/in/erikafranco/

Internet of Things Learning Maps

Future Proofing Industrial Networks

START
Tuesday, February 10 I 8:00 a.m.
BRKIOT-2115
Fabric Networks for OT: The History (IP MPLS), Today (SD-Access) and Emerging Trends (SRv6 and BGP EVPN)

Tuesday, February 10 I 12:00 p.m.
BRKIOT-2269
A Short History of Time in Industrial Systems - Synchronizing Critical Infrastructure Elements with PTP

Tuesday, February 10 I 3:45 p.m.
BRKIOT-3624
Advanced Techniques for Successful Cellular Connectivity Implementation

Wednesday, February 11 I 8:15 a.m.
BRKIOT-2644
Industrial Connectivity Excellence: When Ultra Reliable Wireless Backhaul Meets WiFi in Action

Wednesday, February 11 I 5:15 p.m.
BRKIOT-2876
A Day in the Life of Marty OT Administrator: Securing, Automating, and Assuring OT Operations with Cisco Catalyst Center

Thursday, February 12 I 8:30 a.m.
BRKIOT-2027
123 URWB: A Wireless Network Engineer's Guide

FINISH
Thursday, February 12 I 4:45 p.m.
BRKIOT-2990
5 Ways to Deploy Scalable , Secure AND Cost Sensitive Industrial IoT Solutions for Customers using Cisco Catalyst SD-WAN

Reimagine your IoT Applications and Use Cases

START
Tuesday, February 10 I 1:30 p.m.
IBOIOT-2114
Redefining Industrial Networking: SRv6 for Utilities and Distributed Automation

Wednesday, February 11 I 9:45 a.m.
BRKIOT-2746
AI at the Industrial Edge: Designing Networks that Deliver

Wednesday, February 11 I 11:15 a.m.
BRKIOT-2720
The Future of Manufacturing: Secure, Reliable, AI-Ready Network Architecture

Wednesday, February 11 I 1:45 p.m.
BRKIOT-2849
Factory-as-Code: Operational Excellence through Industrial Network Automation

Wednesday, February 11 I 3:00 p.m.
IBOIOT-1116
Expanding Cloud-Managed Switching to Ruggedized Environments with Meraki Dashboard

Wednesday, February 11 I 5:00 p.m.
IBOIOT-1117
No Ticket Required: AI-Powered Troubleshooting for OT Networks

Thursday, February 12 I 10:00 a.m.
IBOIOT-1116
Expanding Cloud-Managed Switching to Ruggedized Environments with Meraki Dashboard

Thursday, February 12 I 10:30 a.m.
BRKIOT-2808
Smart and Creative Use Cases of Industrial Networking Technologies

Thursday, February 12 I 1:30 p.m.
IBOIOT-1117
No Ticket Required: AI-Powered Troubleshooting for OT Networks

Thursday, February 12 I 5:30 p.m.
IBOIOT-2114
Redefining Industrial Networking: SRv6 for Utilities and Distributed Automation

FINISH
Friday, February 13 I 9:15 a.m.
BRKIOT-2299
The Software-defined Factory Enabled by SDA

Secure your Industrial IoT Environment

START
Tuesday, February 10 I 11:45 a.m.
BRKSEC-2096
Securing Industrial Networks: Where Do I Start?

Tuesday, February 10 I 2:00 p.m.
LTRSEC-2381
Stronger Together: Uniting IT and OT Security with Cyber Vision

Tuesday, February 10 I 5:00 p.m.
IBOIOT-1113
OT Security Made Simple: Your 101 Guide to OT Network Security Assessments

Tuesday, February 10 I 5:15 p.m.
BRKIOT-2846
Enhancing Splunk with OT context using Cisco Cyber Vision

Wednesday, February 11 I 9:30 a.m.
IBOIOT-1113
OT Security Made Simple: Your 101 Guide to OT Network Security Assessments

Wednesday, February 11 I 11:15 a.m.
BRKIOT-2720
The Future of Manufacturing: Secure, Reliable, AI-Ready Network Architecture

Wednesday, February 11 I 3:15 p.m.
BRKIOT-2029
The OT Security Journey: Network Visibility, Segmentation, and Investigation/Response

Thursday, February 12 I 1:00 p.m.
BRKIOT-2910
Securing Industrial Operations: From OT Asset Visibility to Zero-Trust Network Access

Friday, February 13 I 9:00 a.m.
LTRIOT-2110
IT/OT Collaboration: Deploying and Securing Industrial Automation Networks

FINISH
Friday, February 13 I 11:15 a.m.
BRKIOT-2588
From Chaos to Control: Practical Segmentation Strategies for Industrial Networks

Thank you