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DESIGN STUDY

800G leaf–spine for a broker's trading floor and colocation cages

Complete design on current platforms

CAPABILITY	INDUSTRY	SETTING
Networking	Financial Services	Securities broker
DOCUMENT	**VERSION**	**DATE**
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Document control

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Sign-off	"An engagement under this design is signed by the practice lead before any build proceeds."		

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CONVENTIONS

Source tags. [S] figure read from the vendor's own current page on Sep 18, 2026 · [S*] figure from the vendor's page summary where the page itself could not be opened · [A] design assumption, to be confirmed by the signing engineer · [T] design target: the record's outcome figure and anything derived from it. No figure comes from any engagement, file or asset. A row with more than one tag is counted once: as a published figure if any tag is [S] or [S*], otherwise as an assumption if any tag is [A], otherwise as a design target.

Table 1. Revision history

Date	Version	Change
Sep 18, 2026	1.0	First issue.
Sep 20, 2026	1.1	Public implementations added; figures reconciled with published sources.
Sep 27, 2026	1.2	Figures and platform details rechecked against published sources.
Oct 10, 2026	1.3	Approval line now reads: approved by the Founder, issued by Symbeeo. Mark Winston remains the author.

1 · Scope

Who it is for. The head of technology of a securities broker whose trading floor and colocation fabric were built at 10/40G, who needs 800G in the spine, sub-microsecond paths on the trading VLANs, and a second cage in the same metro for continuity.

Typical buyer [A]. A mid-size securities broker, 600 desks, two colocation cages in one Equinix metro. Order-management and market-data servers in the cages; the trading floor in an office connected to the primary cage. Roughly 200 servers per cage, two-thirds at 100G, the rest at 25G.

What is in. Leaf–spine in both cages, the Layer 1 fan-out for market data, the trading-floor distribution, the inter-cage link, and PTP timing end to end. **What is out.** Exchange cross-connects and their commercial terms; server and application design; the security enforcement points (SRA-SEC-001 places them); the office campus beyond the floor distribution.

Assumptions. Arista is the switching vendor [A]. Both cages are in Equinix IBX facilities in one metro and the inter-cage circuit is Equinix Metro Connect [A]. Grandmaster clocks with GNSS antennas are available in both cages [A]. Exchange feeds arrive at 10G into the primary cage [A].

Related documents, read Sep 18, 2026.

- Arista 7060X6 Series product page — `https://www.arista.com/en/products/7060x6-series`
- Arista 7130 Series product page — `https://www.arista.com/en/products/7130-series`
- Arista 7130 Connect Series product page — `https://www.arista.com/en/products/7130-connect`
- Equinix Metro Connect product documentation — `https://docs.equinix.com/metro-connect/`
- Arista case study, electronic trading firm exchange connectivity (Dec 20, 2018), read Sep 20, 2026 — `https://www.arista.com/assets/data/pdf/CaseStudies/CaseStudy-LowLatency.pdf`
- Arista 7060X6 Series data sheet (Dec 4, 2025, 04-0053-09), read Sep 20, 2026 — `https://www.arista.com/assets/data/pdf/Datasheets/7060X6-Datasheet.pdf`
- Arista white paper, 7060X6 Series: Accelerated DC and AI Networking at 800G (Oct 7, 2024), read Sep 20, 2026 — `https://www.arista.com/assets/data/pdf/Whitepapers/7060X6-Series-AI-Networking-at-800G-White-Paper.pdf`

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1c · Public implementations this design follows

Deployment rows are real public deployments, each dated. Where no public deployment matches, the row is Vendor documentation: the vendor's document that this design, Symbeeo's own, is built on.

Table 2. Public implementations this design follows

Implementation	Who published it · date	What it settles for this design	URL
Deployment. Electronic trading firm gains ultra-low latency exchange connectivity with Arista	Arista · Dec 20, 2018	A Layer 1 7130 (48-port) in front of the hosts: data fan-out in 5 ns (2018 unit; the current 7130-48G3S is 4 ns, R7), order entry on MetaMux at the 45 ns level, precision timestamping for compliance, dynamic patching and ad-hoc tapping without rewiring — the shape of §4.3	https://www.arista.com/assets/data/pdf/CaseStudies/CaseStudy-LowLatency.pdf
Vendor documentation. 7060X6 Series data sheet	Arista · Dec 4, 2025, 04-0053-09	7060X6-64PE: 64 × 800G, 51.2 Tbps, 2RU, 700 ns, 165 MB, up to 320 interfaces, max 320 × 100G; 7060X6-32PE: 32 × 800G, 25.6 Tbps, 1RU, 700 ns, 84 MB, up to 256 interfaces (at 200G), max 160 × 100G (model-comparison table; product page confirms 160)	https://www.arista.com/assets/data/pdf/Datasheets/7060X6-Datasheet.pdf
Vendor documentation. 7060X6 Series: Accelerated DC and AI Networking at 800G	Arista · Oct 7, 2024	A two-tier 7060X6 leaf–spine on one switch family (128 leaves, 64 spines) with about 650 ns observed system-wide latency — the fabric shape of §3 at larger scale	https://www.arista.com/assets/data/pdf/Whitepapers/7060X6-Series-AI-Networking-at-800G-White-Paper.pdf

Applied in this design: R4 and §4.2 leaf breakout is 160 × 100G, the data sheet's Max 100 GbE ports for the 32PE (its 256 figure is the 200G interface count); the §3/§4 port plan follows the data sheet's breakout table (two spines per cage, 8 × 100G per 800G port, no 25G breakout).

2 · Requirements register

Table 3. Requirements register

#	Requirement	Value	Source
R1	Desks and cages	600 desks · 2 cages · 1 metro	[A]
R2	Spine port speed	800 Gbps	[T]
R3	Spine platform	64 × 800G OSFP800, 51.2 Tbps, 2 RU	[S] 7060X6-64PE
R4	Leaf platform	32 × 800G OSFP800, 25.6 Tbps, 1 RU; breakout to max 160 × 100G	[S] 7060X6-32PE product page (max 100 GbE ports 160) https://www.arista.com/en/products/7060x6-series; [S] data sheet 04-0053-09 https://www.arista.com/assets/data/pdf/Datasheets/7060X6-Datasheet.pdf
R5	Port-to-port latency, trading VLANs	< 1 µs	[T]
R6	Leaf–spine forwarding latency	from 700 ns	[S] 7060X6

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#	Requirement	Value	Source
R7	Market-data fan-out latency	4 ns port to port	[S] 7130-48G3S
R8	Servers per cage	200: ~130 at 100G, ~70 at 25G	[A]
R9	Inter-cage link	Equinix Metro Connect, 100 Gbps ports, Dual-Diverse	[S] 1/10/100 Gbps ports (100G in select markets); Dual-Diverse 99.999 % SLA
R10	Inter-cage encryption	MACsec on the Metro Connect link	[S] Metro Connect supports LACP and MACsec
R11	Timing	PTP from grandmaster to every leaf and to the trading hosts	[T]; [S] 7130 sub-nanosecond timestamping and PTP
R12	Oversubscription, leaf to spine	1:1 on the trading pod, 3:1 elsewhere	[A]
R13	Availability, trading fabric	99.999 % during market hours	[A]
R14	Second-cage role	active for market data, warm standby for order routing	[A]

Fourteen rows; seven carry a vendor figure, five are design assumptions, two are design targets.

3 · Architecture overview

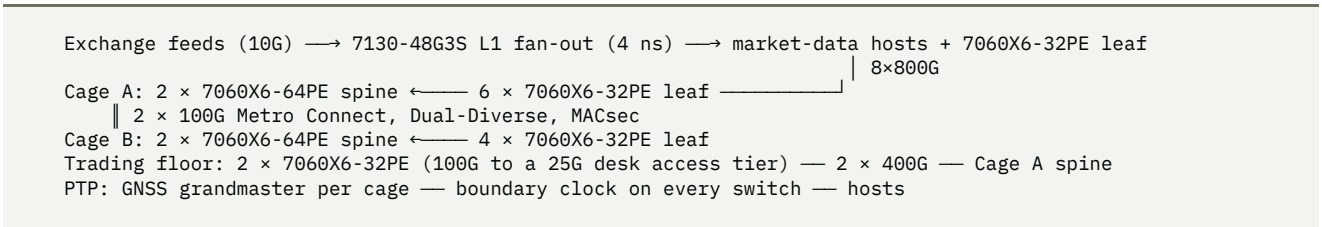


Figure 1. Trading leaf–spine and cages

Two-tier leaf–spine per cage on one switch family, a Layer 1 fan-out in front of the market-data hosts, and a protected metro link between the cages. The trading floor hangs off the primary cage's spine as a pair of leaves.

Table 4. Architecture overview

Role	Product (exact model)	Qty	Capacity used	Why this unit
Spine, per cage	Arista 7060X6-64PE	2 per cage, 4 total	cage A 26 of 64 × 800G per spine (41 %); cage B 17 of 64 (27 %) [S][A]	51.2 Tbps, 800G ports [S]
Leaf, cage A	Arista 7060X6-32PE	6	8 × 800G uplink; 20 × 800G broken out to 160 × 100G (platform max) [S]; 4 × 800G spare	25.6 Tbps, 1 RU, 700 ns [S]
Leaf, cage B	Arista 7060X6-32PE	4	as above	same unit, same software [A]
Trading-floor leaf	Arista 7060X6-32PE	2	2 × 400G to cage A spines; 100G breakout to a 25G desk access tier (family only) [A]	one leaf model everywhere

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Role	Product (exact model)	Qty	Capacity used	Why this unit
Market-data fan-out	Arista 7130-48G3S	2 per cage, 4 total	48 × SFP+ 100M–11.3G [S]	4 ns port to port [S]
Inter-cage link	Equinix Metro Connect, Dual-Diverse, 100 Gbps	2 ports	2 × 100G [S]	99.999 % SLA, MACsec [S]
Grandmaster clock	GNSS PTP grandmaster (family, vendor not named here)	1 per cage	—	[A]

4 · Design by subsystem

4.1 Spine.

7060X6-64PE: 64 × 800G OSFP800, 51.2 Tbps, 2 RU, 165 MB buffer [S]. Two per cage; every leaf dual-homed with 4 × 800G per spine. Cage A, per spine: 24 leaf ports, one port broken out to 2 × 400G for the floor leaves, one broken out for the 100G Metro Connect port — 26 of 64 day one, 38 free; cage B 17 of 64 [A]. Rejected: 7060X6-32PE as spine — fits day one (26 of 32 ports in cage A) but caps a cage at seven leaves at four 800G ports per spine per leaf (R3).

4.2 Leaf.

7060X6-32PE: 32 × 800G, 25.6 Tbps, 1 RU, 84 MB buffer, breakout to 64 × 400G or max 160 × 100G [S] (product page; data sheet 04-0053-09). Per leaf: 8 × 800G to the two spines (four per spine), 20 × 800G broken out to 160 × 100G for hosts, 4 × 800G spare [A] — 16 Tbps host-facing over 6.4 Tbps uplink, 2.5:1, inside R12's 3:1; on the trading pod host ports and uplinks are balanced 1:1 (R12) [A]. The 25G hosts (R8) attach through a 25G access tier uplinked at 100G, named by family only: 25G is not on the 7060X6 breakout list (800/400/200/100/50/10G) [S]. Rejected: 25G desks or hosts on 7060X6 breakout — not offered.

4.3 Market-data fan-out.

7130-48G3S: 48 × SFP+, 4 ns port-to-port, 1 RU [S]. Exchange feeds enter the Layer 1 switch and are replicated to market-data hosts and to a leaf port, so the hosts see the feed at wire speed before any Layer 2/3 hop [A]. The 7130 family lists sub-nanosecond timestamping and PTP [S]; the design timestamps every feed at ingress [A]. Rejected: fan-out through the leaf — adds the 700 ns leaf latency to every feed copy (R7).

4.4 Trading floor.

Two 7060X6-32PE as leaves in the office, each with 2 × 400G (from an 800G port broken out) to the cage A spines over the office-to-cage fiber [A]. 600 desks at 25G on an access tier (family only), each access unit dual-homed at 100G to both floor leaves [A]. Latency budget, desk to order gateway in cage A: two leaf hops plus one spine hop, three × 700 ns = 2.1 µs, plus the access-tier hop, unquantified here; the sub-microsecond target applies to the port-to-port path inside the cage (R5), not the desk [A].

4.5 Inter-cage link.

Equinix Metro Connect, Dual-Diverse: two end-to-end diverse fiber paths with node protection, 99.999 % availability SLA [S]; 100 Gbps ports, available in select markets [S] — the design assumes the metro is one of them [A]. Two ports in an LACP bundle with MACsec, both supported on the service [S]. Rejected: Unprotected Metro Connect — 99.9 % SLA fails R13.

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4.6 Timing.

One GNSS-disciplined PTP grandmaster per cage [A]; every 7060X6 and 7130 in the path runs as a PTP boundary clock [A]; trading hosts sync to their leaf. Cage B's grandmaster is the holdover source for cage A over the Metro Connect link [A]. Grandmaster hardware is named by family only; its vendor is not named here.

4.7 Second cage.

Cage B carries live market data and a warm copy of order routing (R14). Fabric identical in design, two fewer leaves [A]. Rejected: cold standby — no live traffic means no evidence the fabric works before it is needed.

5 · Failure behavior

Table 5. Failure behavior

Failure	Behavior	Source
One spine down	every leaf keeps its links to the other spine; fabric at half spine capacity; the surviving spine carries its 26 ports unchanged	[A]
One leaf down	dual-homed hosts stay up on the second leaf	[A]
One 7130 fan-out down	second unit carries the feed; hosts on the failed unit lose the direct copy and read from the leaf path at +700 ns	[S] 7060X6 latency; [A]
One Metro Connect path down	traffic continues on the second diverse path; service SLA 99.999 %	[S] Dual-Diverse
Grandmaster in cage A lost	boundary clocks hold over; cage B grandmaster becomes source over the metro link	[A]
Cage A lost	cage B serves market data live; order routing fails over under the client's runbook	[A]

6 · Limits

- The 700 ns figure is Arista's "from" figure for the 7060X6; the sub-microsecond target is met on a single switch hop (same leaf); a leaf–spine–leaf path in the cage is about 2.1 µs, and the desk-to-cage path is about 2.1 µs on the 7060X6 hops alone, before the access tier.
- 100 Gbps Metro Connect ports are listed for select markets; if the metro is not one, the link drops to bundled 10 Gbps ports and R9 changes.
- Spine ports are 41 % used day one in cage A, 27 % in cage B; the design is oversized at the spine and could be built on fewer ports.
- 25G hosts and desks need an access tier below the 7060X6 (25G is not on its breakout list); that tier is named by family only and its port plan is not in this document.
- PTP grandmaster hardware is named by family only; its vendor is not named here.
- No exchange cross-connect design is included; feed count and speed are assumptions.

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7 · Lessons learned

None yet — this is a design study; populated after the first build against it.

8 · The author

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Signed off by Edwin Ozer, Founder.

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SYMBEEO

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Figures are as published by their sources on the dates given in this document; figures marked [A] are assumptions.

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