

CCIE Enterprise Infrastructure v1.1

\$ FIELD REFERENCE // the commands, values, and gotchas that matter

A condensed reference for the CCIE EI v1.1 lab, distilled from 58 articles built on real Cisco IOS XE output. Every value here was verified in Cisco Modeling Labs. Pair it with the full study hub at pinglabz.com/ccie-enterprise.

Administrative Distance (the table that settles most redistribution fights)

Connected / Static	0 / 1
EIGRP summary	5 <-- beats almost everything on the summarising router
eBGP	20
EIGRP internal	90
OSPF (all types)	110
IS-IS	115
RIP	120
EIGRP external	170 <-- LOSES to OSPF 110: the classic redistribution trap
iBGP	200

BGP best-path order (top wins)

1 Weight	highest (Cisco-only, local)
2 Local preference	highest
3 Locally originated	network / redistribute / aggregate
4 AS-path	shortest
5 Origin	IGP < EGP < incomplete
6 MED	lowest (same neighbour AS)
7 eBGP over iBGP	prefer external
8 IGP metric to next-hop	lowest
9-13 tie-breaks	oldest eBGP, lowest RID, lowest cluster, lowest neighbour IP

OSPF path preference (TYPE beats metric)

O > O IA > E1 > N1 > E2 > N2. Route type is compared before the metric - an N1 at cost 31 beats an E2 at cost 20. E1 metric = external + internal-to-ASBR; E2 metric = external only.

The gotchas that cost hours (verified in CML)

eBGP multipath	silently applies next-hop-self toward iBGP peers, masking a missing next-hop-self
RTBH on IOS XE 17.x	a Null0-only static is NOT enough - the discard next-hop needs a connected route
BGP dampening	the eBGP advertisement-interval hides flaps before dampening ever counts them
OSPF forwarding addr	if the FA subnet leaves the RIB (suppression/range), the external route is silently dropped

EIGRP So0 (global)	ip vrf sitemap does nothing in the global table on IOL-XE; use route tags instead
Dual-hub DMVPN	default NHRP holdtime is 7200s - set it to 300 or a hub failure black-holes for 2 hours
VRF-aware NAT	the vrf keyword on ip nat inside source is the whole feature; without it overlaps collide
MST region split	different config digest = different region; diff show spanning-tree mst config digest

Transport quick reference

6PE	ipv6 unicast + send-label; one label; global table IPv6 transit
6VPE	vpnv6 unicast; TWO labels (transport + VPN); per-VRF; next-hop ::FFFF:x.x.x.x
as-override	on the PE - rewrites customer AS to provider AS (same-AS customer sites)
allowas-in N	on the CE - tolerate own AS in the path N times
IKEv1 healthy	show crypto isakmp sa -> QM_IDLE
IKEv2 healthy	show crypto ikev2 sa -> READY; set ikev2-profile in the IPsec profile selects it

SD-WAN OMP = BGP for the overlay

OMP route	= a BGP prefix
TLOC	= the next-hop, enriched: system-ip : color : encap
Controller (vSmart)	= a BGP route reflector
show sdwan control connections	first command on any edge - Manager/Validator/Controller all up?
show sdwan omp routes / tlocs	what the control plane knows
show sdwan bfd sessions	whether the tunnels actually work
AAR	steers by SLA class measured live via BFD - show sdwan app-route stats

Services & security

SNMPv3	authPriv, SHA + AES. Trap receiver's createUser must use the ROUTER's engine ID
Trap vs Inform	trap = fire-and-forget; inform = acknowledged + retransmitted (use for events you can't lose)
DHCP snooping	trust the uplinks + every inter-switch trunk; it is the foundation DAI/IPSG depend on
DAI / IPSG	read the snooping binding table; static hosts need an ip source-binding or ARP ACL first
DHCPv6-PD	delegate a prefix, store as a general-prefix, number interfaces from it -> one-line renumber
EPC (iol-xe)	classic monitor capture buffer/point syntax; the modern one-liner is Invalid input

Automation

The pipeline	YAML vars -> Jinja2 render -> Netmiko push -> verify. Runs on any platform (just SSH)
Formats follow transport	NETCONF = XML, RESTCONF = JSON, Ansible authoring = YAML - one YANG model, three encodings
EEM state capture	\$_cli_result carries a show command's output into an action - catch state at the event
EEM correlation	event tags + a trigger/correlate block (and/or) - event type shows as 'multiple'
On-box (Guest Shell/MDT)	needs IOx/DMI - absent on IOL; off-box (Netmiko) is the default that works everywhere

The full 58-article study hub, all on real Cisco output: pinglabz.com/ccie-enterprise. The four Super Labs: pinglabz.com/ccie-labs.