



A SZAKÉRTŐ IT MEGOLDÁSSZÁLLÍTÓ

-  HIBRID IT FELHŐ
-  VÁLLALATI MOBILITÁS
-  ÜZLETI MEGOLDÁSOK
-  IT BIZTONSÁG
-  HÁLÓZATOK
-  CAD / CAM / PLM
-  7 X 24 / 365

RUGALMASSÁG



STABILITÁS



KORREKTSÉG



SZAKÉRTELEM



MEGBÍZHATÓSÁG



NCS5500 bemutató

Balla Attila

Napirend



- NCS5k család
- Architektúra
- Memória – Packet forwarding
- Pozicionálás

NCS5500 platform



Fix kiépítettségű

- 1-2 RU magas
- Nagy portsűrűség
- 10GE-100GE
- Base és -SE kivitel
- IOS-XR 64-bit
- Pay-as-you-grow modell



Moduláris kiépítettségű

- 3 chassis
- 7 féle I/O modul
- Orthogonális design



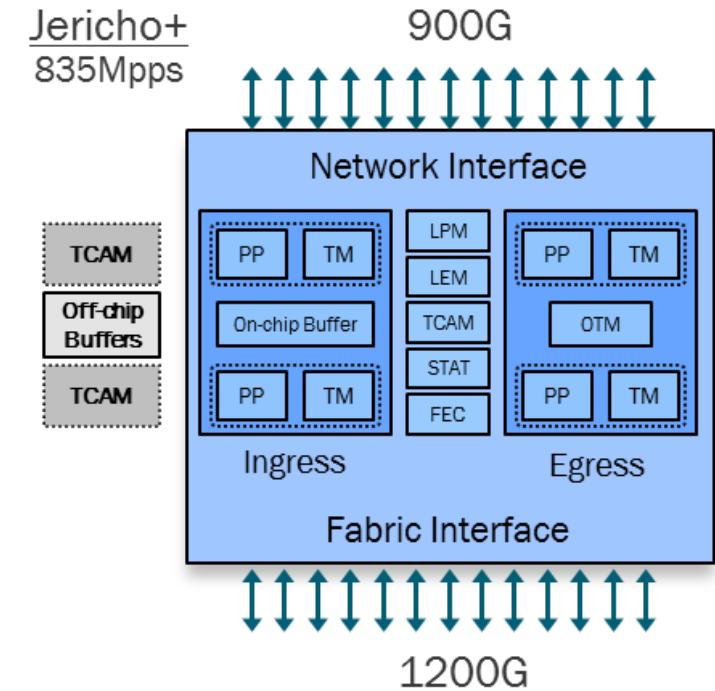
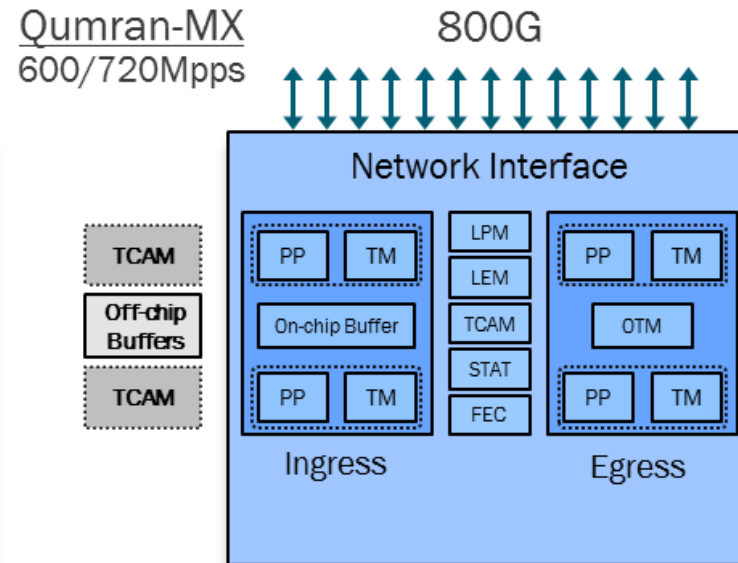
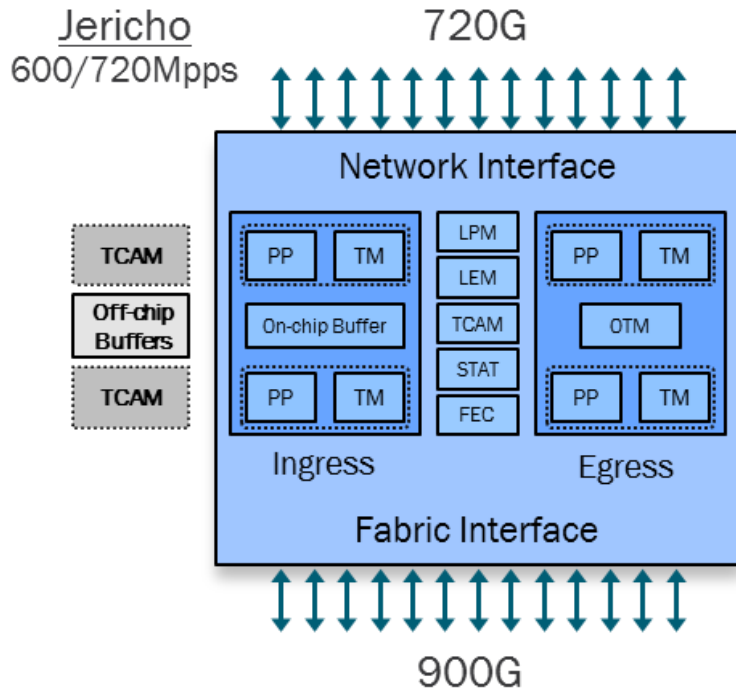
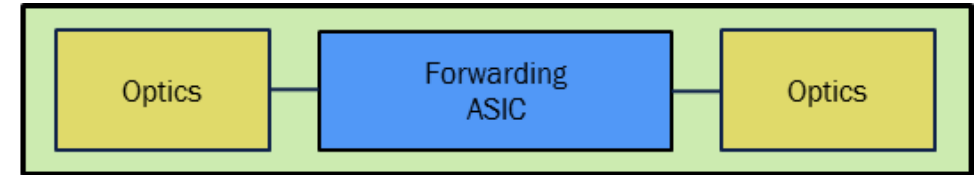
NCS5500 architektúra



BroadCom chip

- Egyszerű, kevés komponens

NCS 5501



NCS5500 Fix Chassis



NCS 5501-SE

Single 800 Gbps QMx, 4GB packet buffer

- 600 Mpps

No Oversubscription, total interfaces: 800G

- 40x 1/10G SFP ports
- 4x 40/100G QSFP ports

Support of Timing and DWDM interfaces

LEM/LPM memory: 786k/256k-350k

2M IPv4 routing entry in eTCAM

NCS 5501

Single 800 Gbps QMx, 4GB packet buffer

- 720 Mpps

Oversubscribed design, total bandwidth of 1.08 Tbps

- 48x 1/10G SFP ports
- 6x 40/100G QSFP28 ports

No Timing/DWDM Support

LEM/LPM memory: 786k/256k-350k

No eTCAM



← 16 regular ports (ports 0 to 15) →
← 24 ports DWDM/ZR capable (ports 16 to 39) →



NCS5500 Fix Chassis



NCS 5502-SE & NCS5502

8db Jericho BroadCom chip

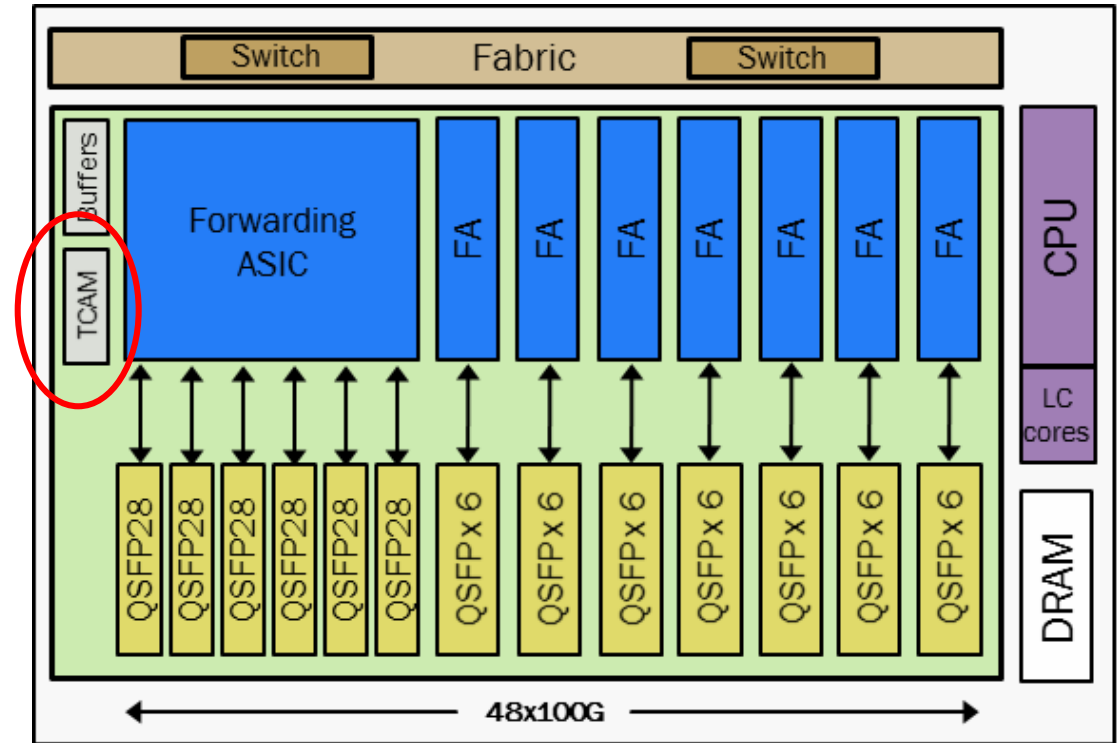
- 600 Gbps per Forwarding ASICs
- 600/720Mpps per FA (SE/Base)

Switch Fabric: 2x Fabric Element

- 18x25Gbps lane per Fabric Element

4.8 Tbps line-rate 100G < 1850W (Typical, SR optics)

48x 100G QSFP28 (or QSFP+)



Product	LEM	LPM	eTCAM
NCS5502	786k	256k-350k	-
NCS5502-SE	786k	256k-350k	2M



NCS5500 Fix Chassis



NCS-55A1-36H-S / NCS-55A1-36H-SE-S

4db Jericho+ BroadCom chip

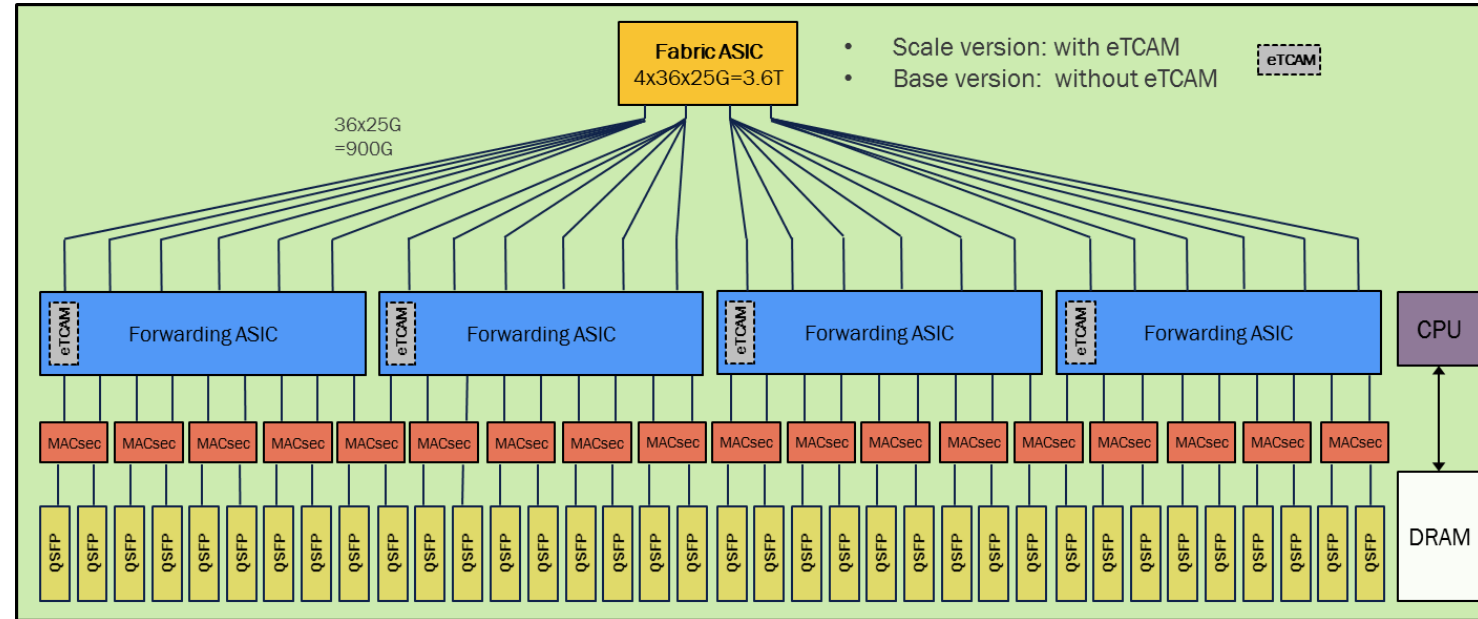
- 900 Gbps per Forwarding ASICs

1db 3.6Tbps Fabric ASIC

1588v2 PTP & SyncE

MACSec

36x 100G QSFP28 (or QSFP+)



Product	LEM	LPM	eTCAM
NCS-55A1-36H-S	786k	256k-350k	-
NCS-55A1-36H-SE-S	786k	256k-350k	4M+



NCS5500 Fix Chassis



NCS-55A1-24H

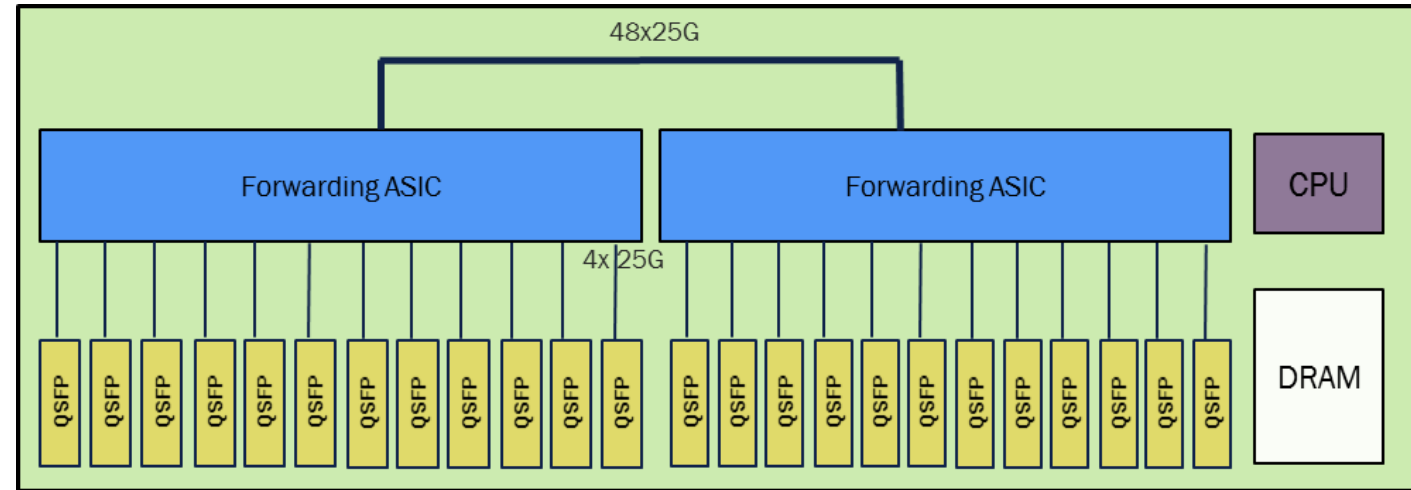
2db Jericho+ BroadCom chip

- 900 Gbps per Forwarding ASICs → 1.8Tbps
- Overbooked: 75%
- Back-to-Back: nincs Fabric ASIC

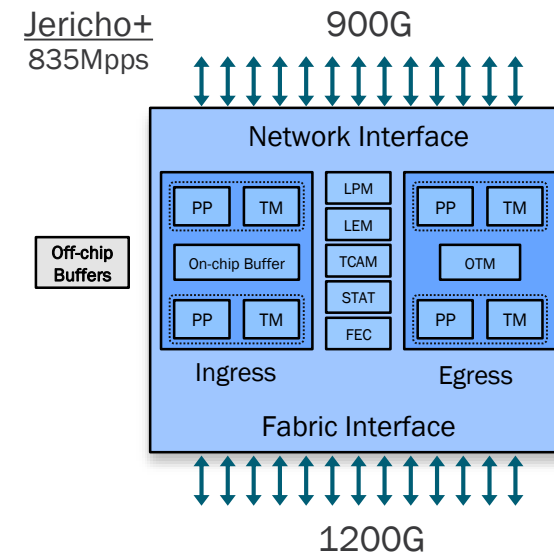
1588v2 PTP & SyncE

No MACSec

24x 100G QSFP28 (or QSFP+)



Product	LEM	LPM	eTCAM
NCS-55A1-24H	786k	1-1.3M	-



NCS5500 Fix Chassis

NCS-55A2-MOD

1db Jericho+ BroadCom chip

- 24x GE/10GE SFP+
- 16x GE/10GE/25GE SFP28
- 2x MPA (400Gbps)

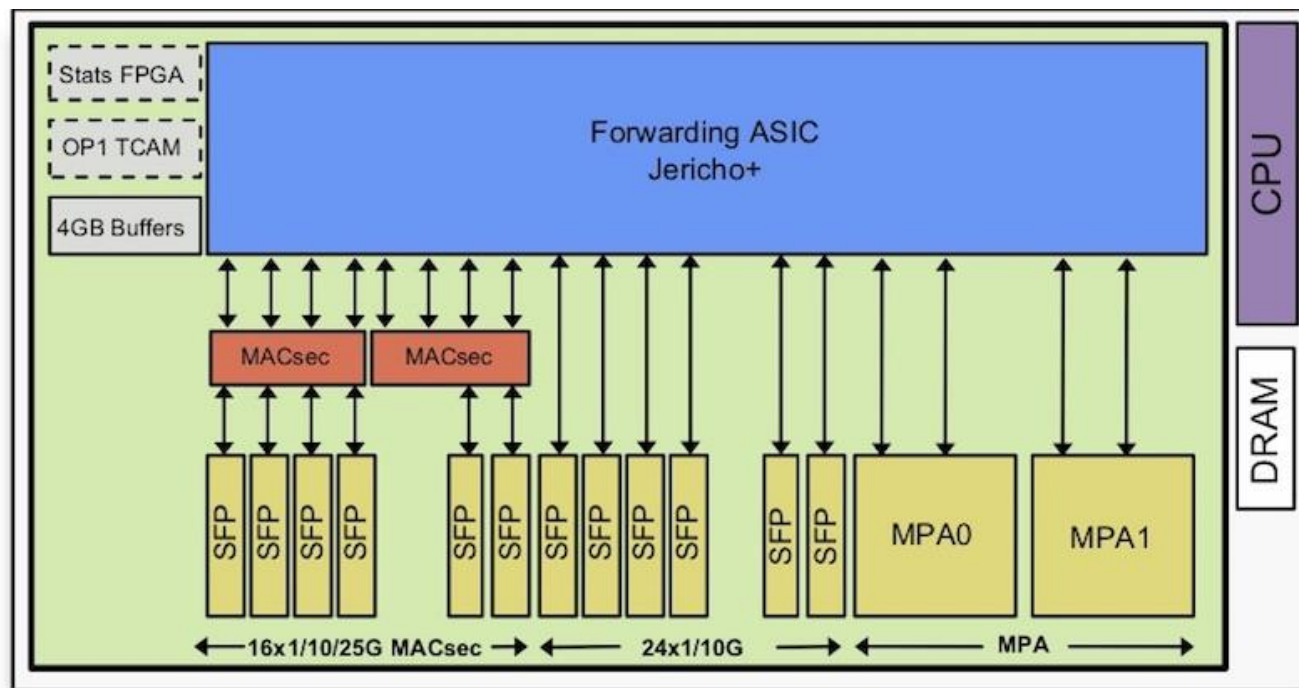
Σ1.44Tbps overbooked → 900Gbps

-SE verzió is van

300mm mély, TEMP HRD verzió is van

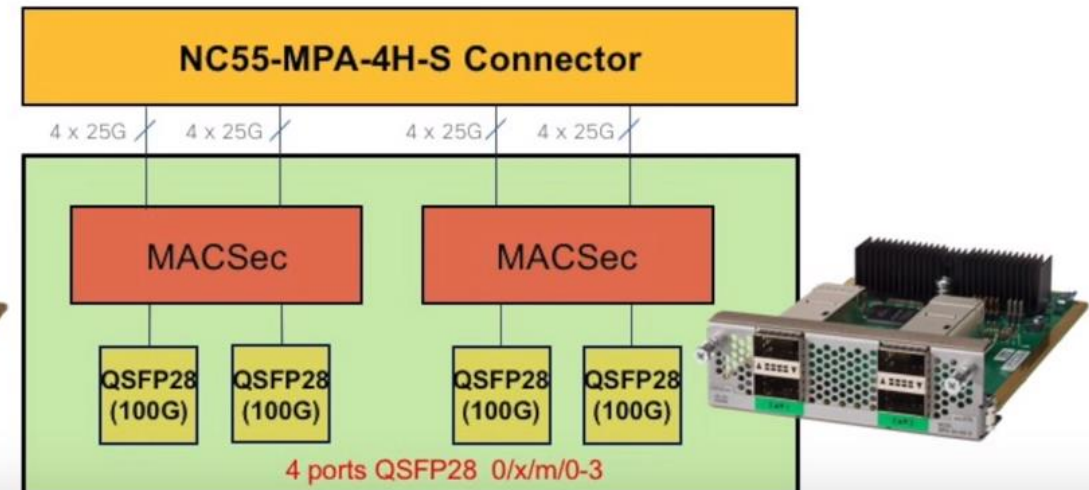
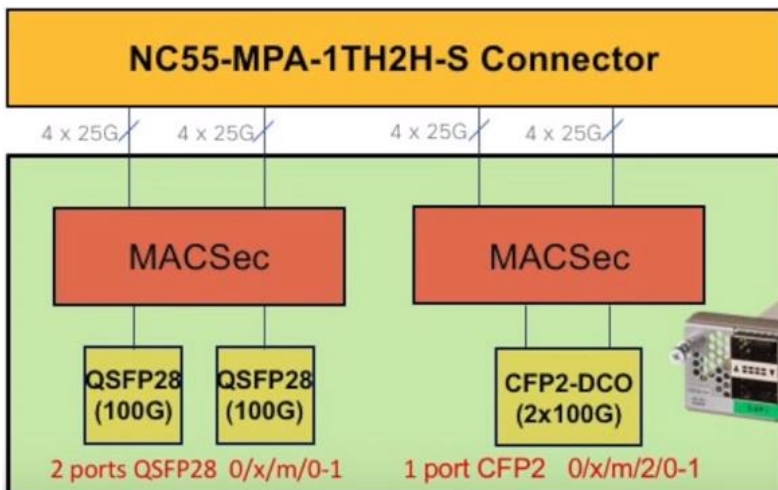
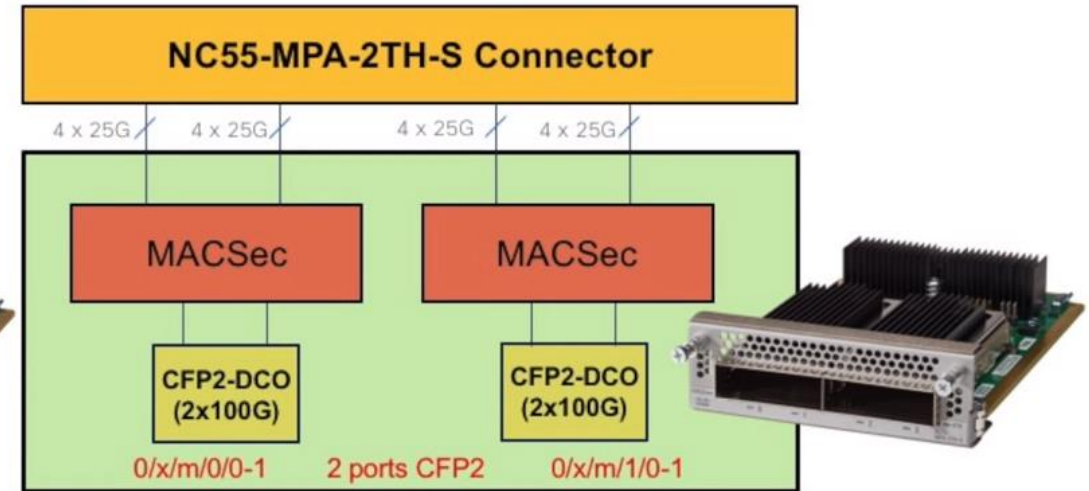
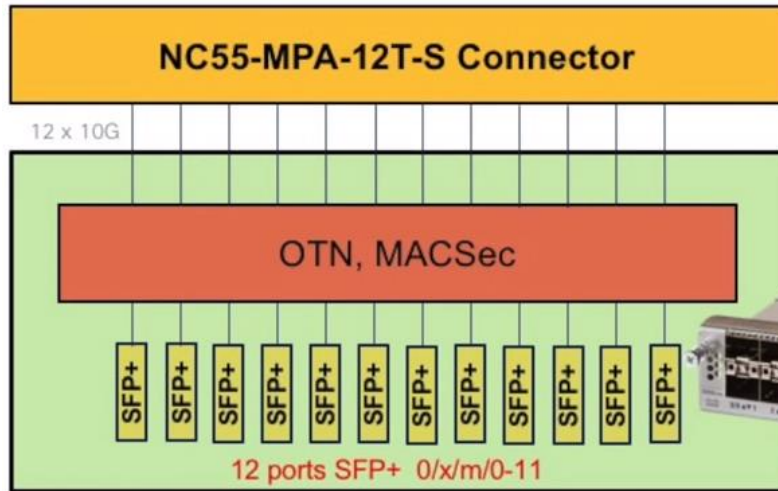
1588v2 PTP & SyncE

MACSec



Product	LEM	LPM	eTCAM
NCS-55A2-MOD	786k	256k-350k	opcionális

NCS5500 Fix Chassis – modulok



Optikai csatolók



Ethernet-only platform

SFP optikai slot

- SFP GigabitEthernet
- SFP+ 10GigabitEthernet
- NCS5501 platform



QSFP optikai slot

- QSFP28 100GigabitEthernet
- QSFP+ 40GigabitEthernet
- QSFP+ break-out 4x10Gbps
- QSFP28 break-out 4x25Gbps – Jericho+



<https://tmgmatrix.cisco.com/home>

NCS5500 Memória terület



Longest Prefix Match Database (LPM)

- Used to store IPv4 and IPv6 prefixes
- Algorithmic memory: worst case 256k entries (IPv6 uses 2 entries) ~ 350k IPv4 / 160k IPv6

Large Exact Match Database (LEM)

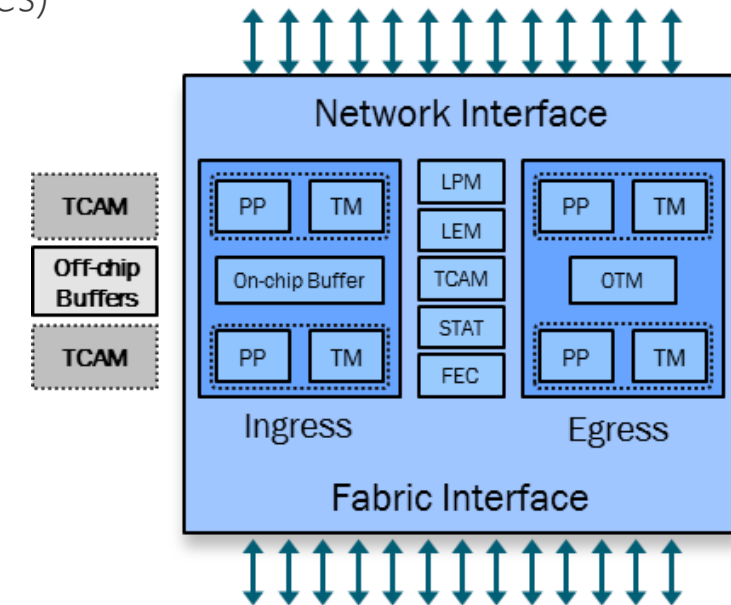
- Used to store MAC addresses, MPLS labels and IPv4 host prefix (but also /24, /23, /20... Database size: 786k entries)

Internal TCAM (iTTCAM)

- Packet classification (ACL, QoS, VLAN ranges, tunnels. Database size: 48k entries)

External TCAM (eTCAM, not on all line cards / systems)

- Used for unicast route scale up to 2M or 4M IPv4 Routes
- Used to extend ACL and classification
- Not for /32



NCS5500 Memória terület

FEC

- Used for NextHop and ECMP (128k entries)
- Contains the FEC ECMP (4k entries)

Egress Encapsulation DB (EEDB)

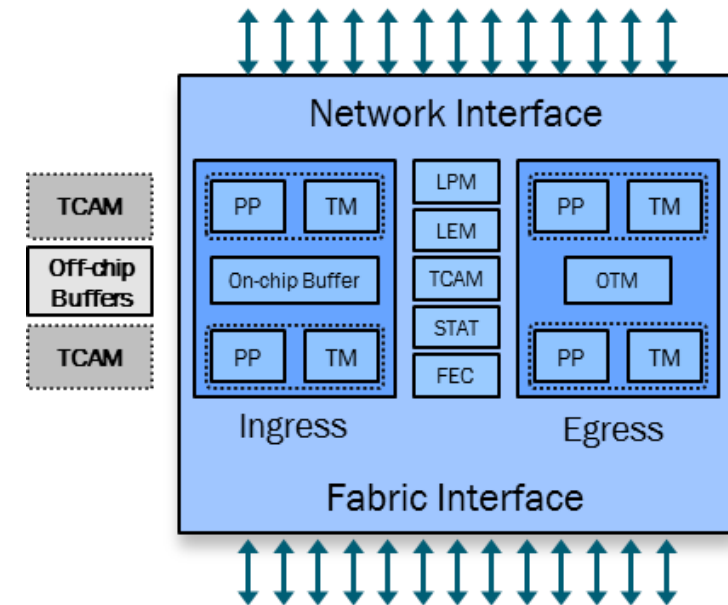
- Used for egress rewrites (96k entries)
- Link Local – ARP, ND
- Tunnel – MPLS label, GRE, etc

Ingress/Egress Small Exact Match (ISEM/ESEM)

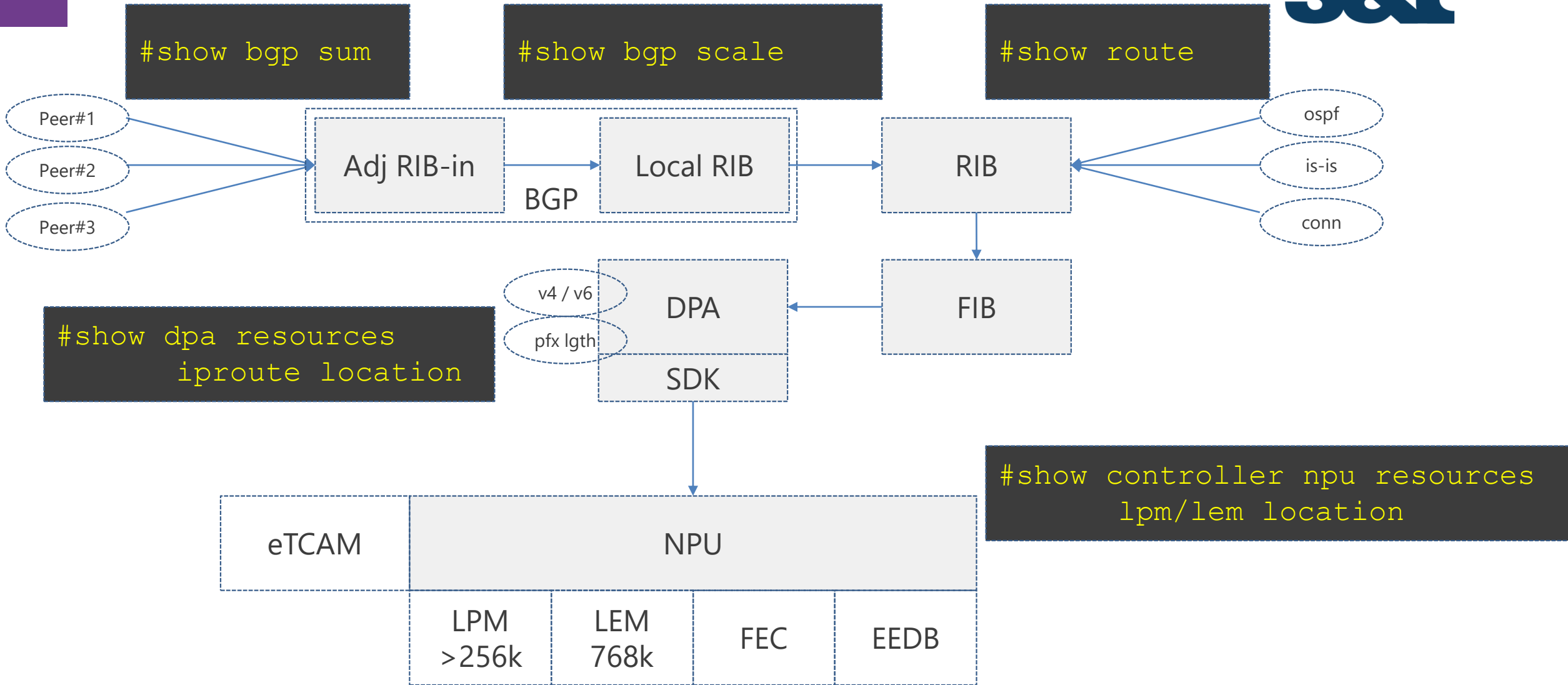
- Used for tunnel termination and egress VLAN translation

Statistics

- Used to store all counters (256k entries)



Routing bejegyzések



Teljes BGP tábla – referencia



Hagyományos chipset, eTCAM nélkül

15 full feed:

- 700k IPv4 route per neighbor
- prefix memory: 100MB
- 10M AS path
- Path memory: 800MB

LPM (256k-350k): 81%

LEM (768k): 52%

2021Q2 után redesign...

Módosított chipset, NCS55A1

2 full feed:

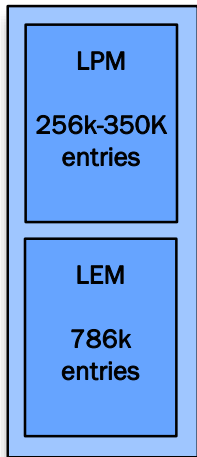
- 700k IPv4 route per neighbor
- prefix memory: 100MB
- 1.5M AS path
- Path memory: 120MB

LPM (1M-1.3Mk): 20%

LEM (768k): 52%

2021Q2 után sem lesz probléma

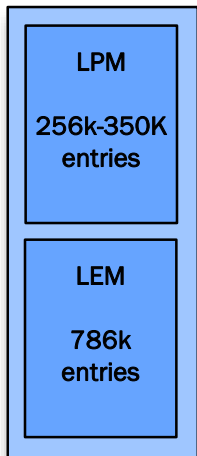
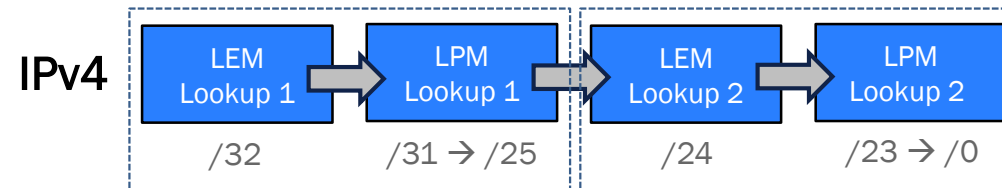
NCS5500 Packet Lookup – non e-TCAM



IPv4 prefixes
(except those in LEM)
IPv6 prefixes (non-/48s)
Multicast groups v4

IPv4 prefixes (/32s and /24s)
IPv6 prefixes (/48s)
MPLS labels
MAC addresses

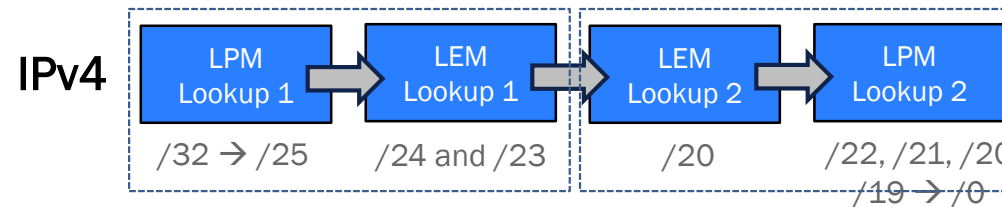
Host Optimized Mode – Jericho



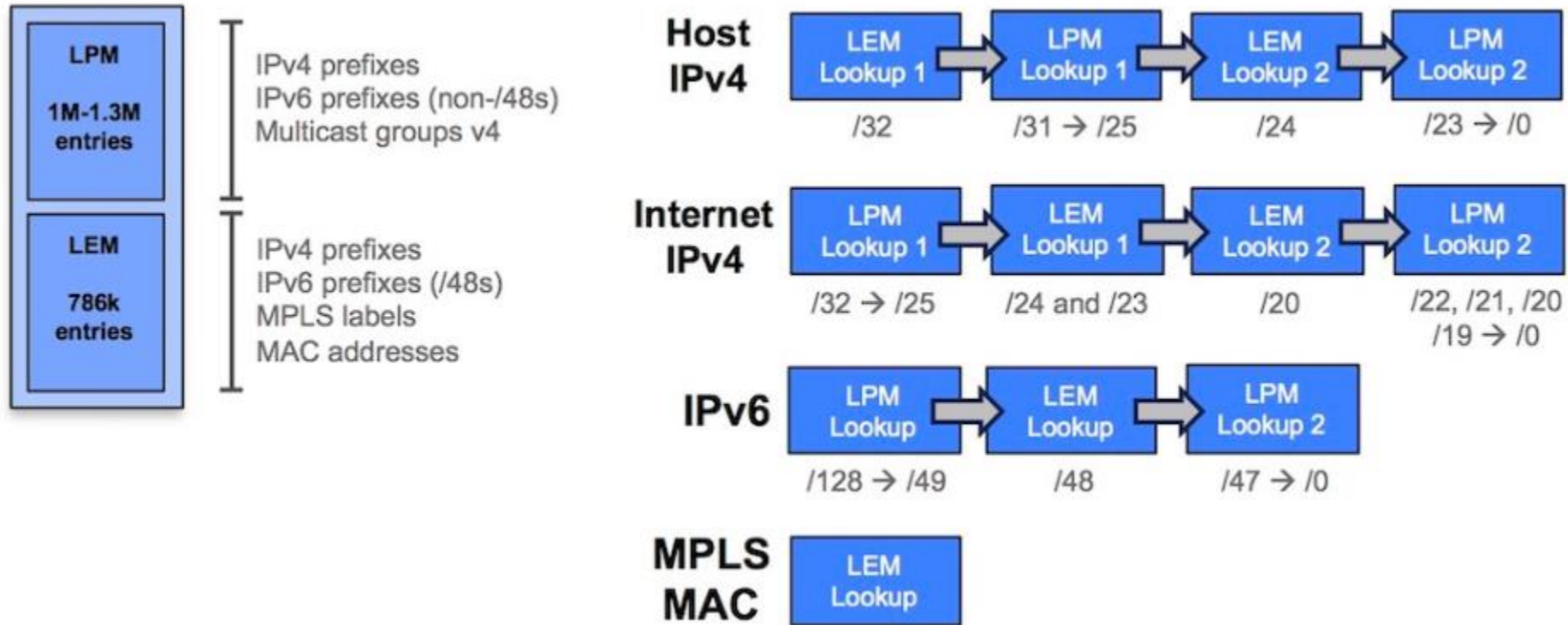
IPv4 prefixes
(except those in LEM)
IPv6 prefixes (non-/48s)
Multicast groups v4

IPv4 prefixes (/20s, /23s - /24s)
IPv6 prefixes (/48s)
MPLS labels
MAC addresses

Internet Optimized Mode – Jericho



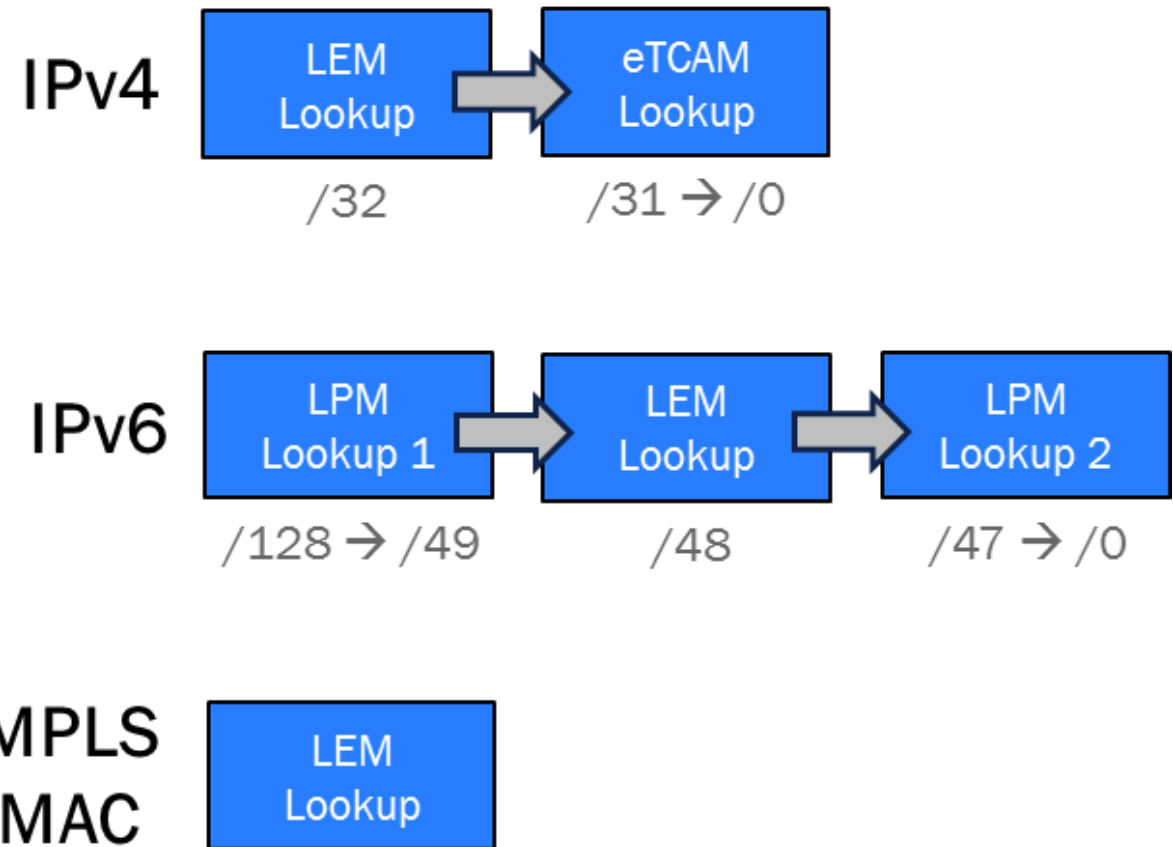
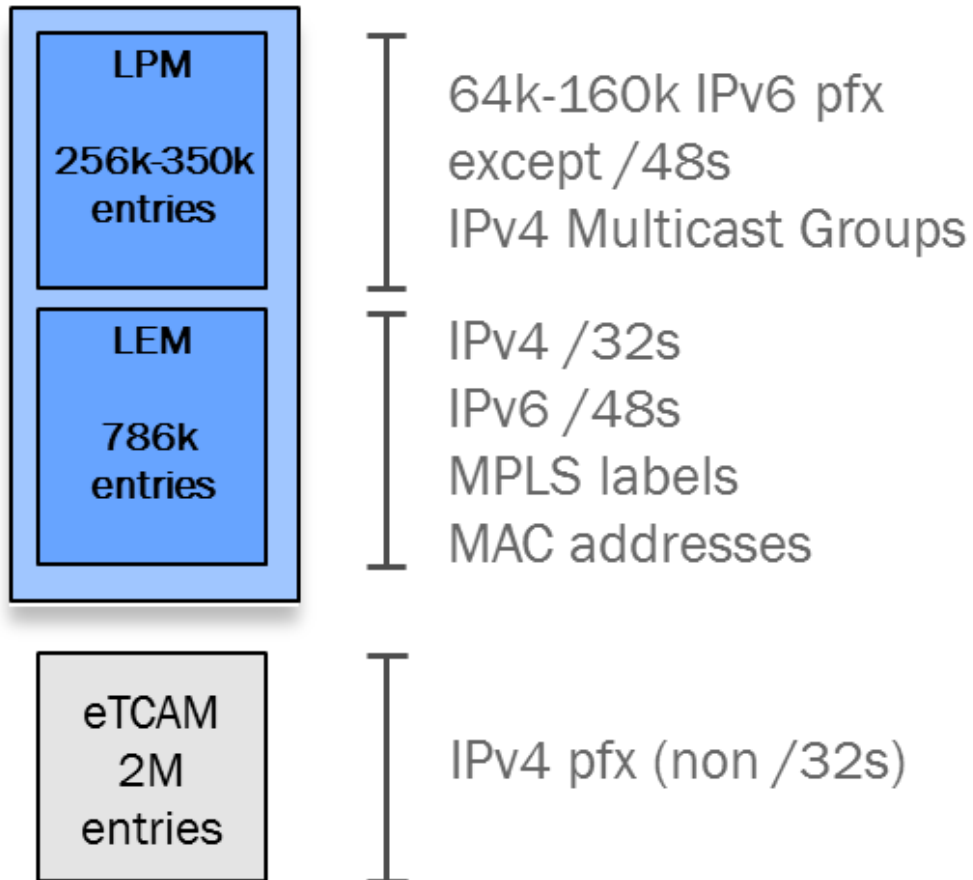
NCS55A1-24H Packet Lookup



NCS5500 Packet Lookup – e-TCAM



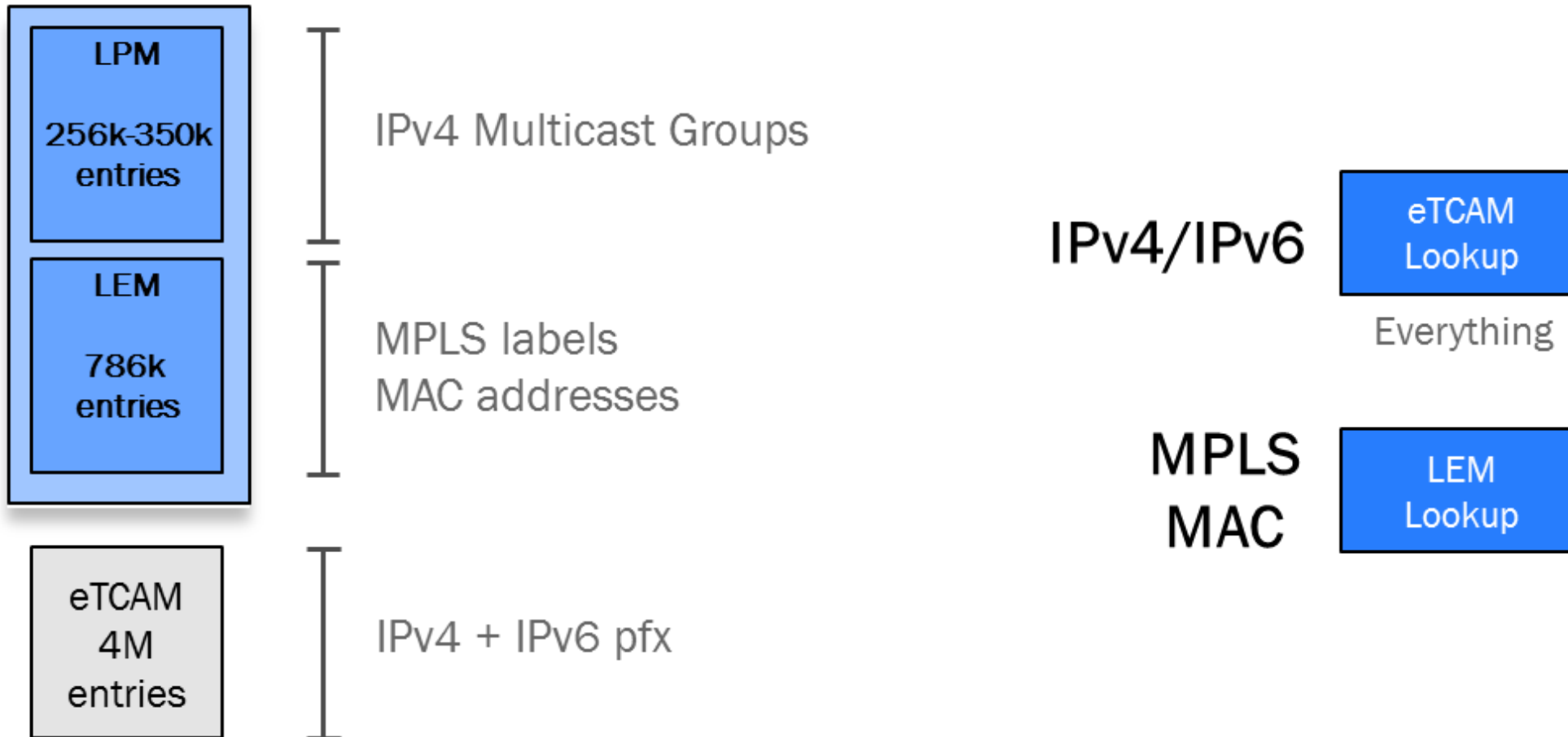
Default Distribution Mode – Jericho



NCS5500 Packet Lookup – e-TCAM



Default Distribution Mode – Jericho+



NCS5500 pozicionálás



Tervezési szempontok

- Port típus/sűrűség
- Skálázhatóság
- Buffer méret
- Funkciók
- Áramfelvétel
- Op. Rendszer (IOS-XR)

Nincs egyértelmű szabály

Mégis hol látjuk a helyét Magyarországon?

- Internet Border Router
- Core Router
- Distributed DC ToR/EoR device
- Carrier Ethernet
- Mobile 5G networks

Technológia szempont alapján

- Segment Routing



Ami kimaradt

Licensing

Moduláris NCS5500

Fix kiépítésű NCS 50xx

QoS

Multicast

Belső protokollok

Memória optimalizálás – RPF

ACL

Software Architecture

<https://xrdocs.io/>





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-  7 X 24 / 365

RUGALMASSÁG



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Q & A

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