



ARISTA Cloud Builders



What's New in EOS Update

Arista EMEA Cloud Builders Technical Forum – Spring/Summer 2019

Agenda

- Recent EOS features
- EOS lifecycle
- Improving software scale
- Small CLI changes
- Version management (upgrades)
- What else is coming





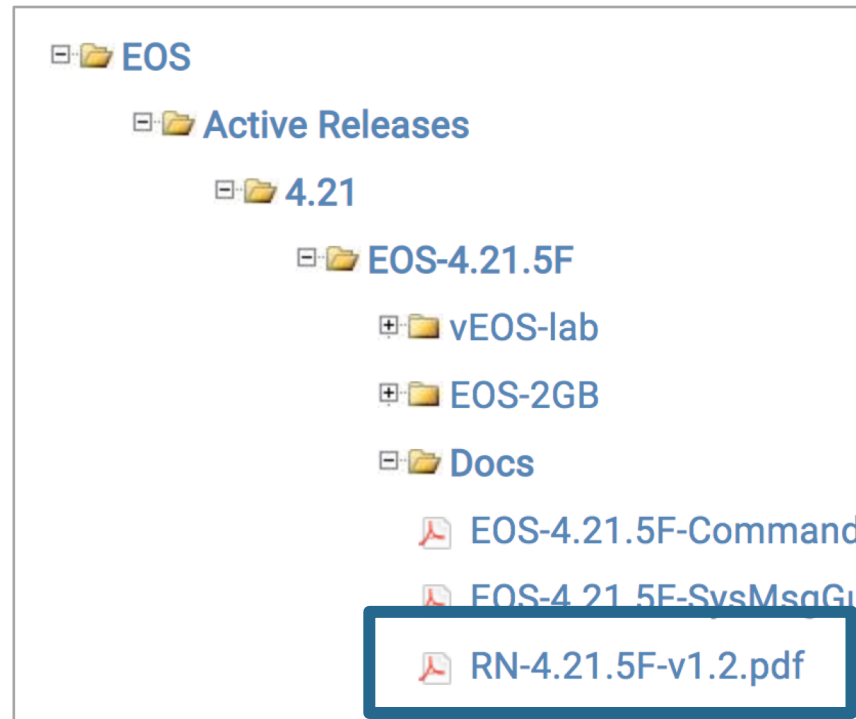
What's New in EOS Update

EOS – Recent features

New features – Where to find about them?

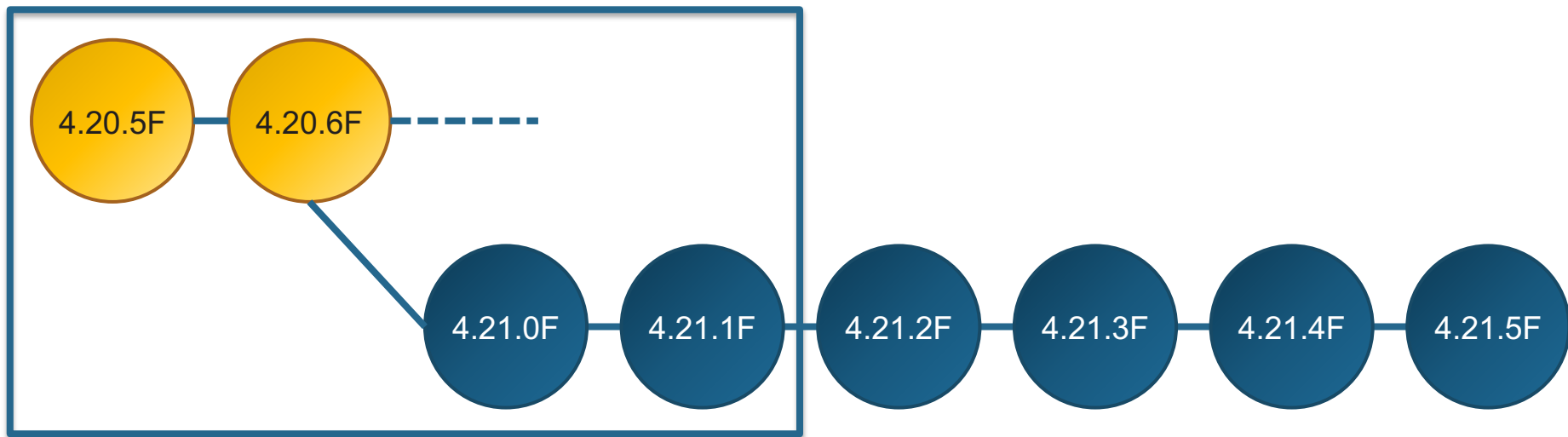
EOS Release	TOIs
4.21	<ul style="list-style-type: none">EOS-4.21.3FEOS-4.21.1FEOS-4.21.0F
4.20	<ul style="list-style-type: none">EOS-4.20.6FEOS-4.20.5FEOS-4.20.1F

eos.arista.com/toi



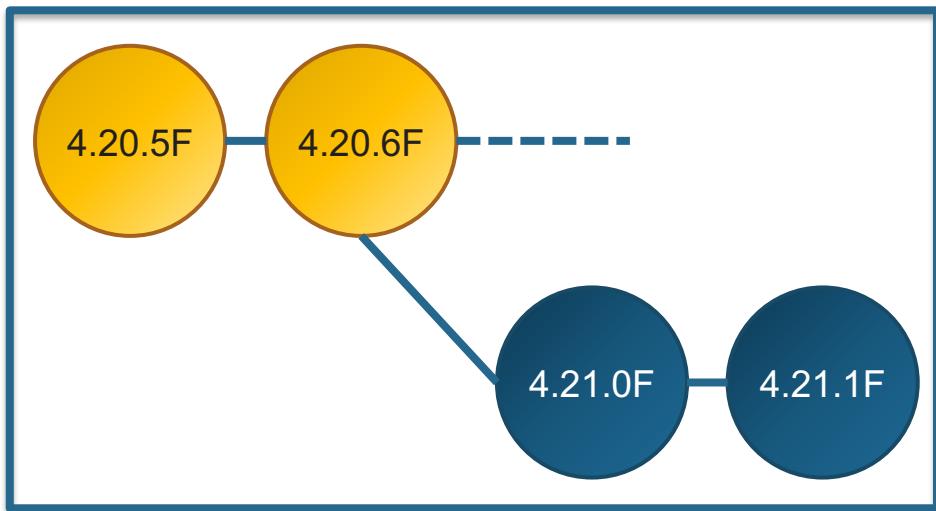
arista.com > [support](#) > [download](#)

Recent EOS *F* releases



*Covered in a previous
Cloud Builders forum
(Q4 2018)*

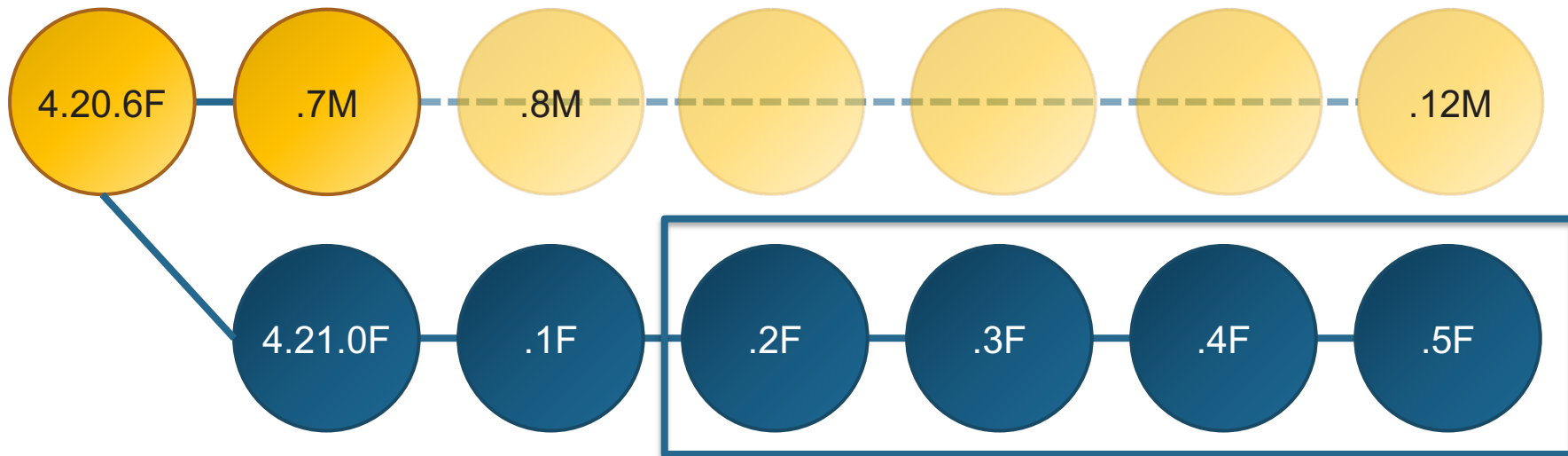
Recent EOS *F* releases - Recapitulation



*Covered in a previous
Cloud Builders forum
(Q4 2018)*

- Multicast with VXLAN
- Layer3 scaling
 - VRF: 2K
 - RIB: 8M
 - LDP FEC: 124K
- More L2 / L3 sub-interfaces features
- MPLS L3 IP VPN (RFC4364)
- vEOS Router - in cloud providers
- 6PE, 6vPE
- VRF leaking
- RSVP-TE, SR-TE
- DANZ Tap Agg 2-way ports

Recent EOS *F* releases



Most recent F releases

4.21.3F features

- Timeout parameter for eAPI requests
- Provide User Control of Selective ARP
- Support for new OpenConfig paths
- VXLAN Static and EVPN Dual Configuration
- EOS SWI image verification
- Asset tagging
- EVPN MLAG Shared Router MAC
- Multi-VTEP MLAG
- Virtual IP Failover Support
- cEOS License Scheme
- Configurable log archiving destination
- Default Admin Status of Ethernet Interfaces
- Discontiguous IPv4 Mask Algomatch 7160 Series ACL Support
- "show interfaces interactions" CLI command
- Arista 7280R Series 40G/100G systems Multi-Speed Port Configuration
- FPGA repair during ASU
- FPGA repair on CRC error
- Improved Feature Limitation Check for SSU
- Forwarding Unicast PTP Packets in Boundary Mode
- Support for matching AS path length in BGP
- Support for route-map subroutines
- BGP conditional route inject
- RIB route control: next hop resolution policy
- BGP IPv6 Link Local Peers Discovery
- Notification Message Support for BGP Graceful Restart
- BGP Missing Policy Action
- Set BGP Multi-Exit-Discriminator for IGP Routes
- BGP neighbor default-originate always
- Configurable L2 EVPN MPLS control word
- IS-IS Authentication Using SHA
- IS-IS LSDB Export
- IS-IS Minimum Remaining Lifetime
- Multicast ingress replication filter
- MACsec Proxy For Front Panel Ports
- TAP Aggregation – 802.1Q Tag Stripping
- Mirroring To GRE Timestamping
- Match ECN bits in Mirroring and Security ACLs
- CLI Knob to disallow tagged packets on L2 access ports
- EVPN IRB with MPLS Underlay
- Remap traffic-class to priority-group via CLI
- Counters to track headroom peak usage per port per COS
- L3 Sub-Interface Counters Support on DCS-7160 Series
- Inter-VRF Local Route Leaking
- Multicast Traffic in Vxlan Using Underlay
- Bidirectional PIM
- Configure ECN max-mark-probability and weight
- Support for BGP flowspec
- Egress per port v4 and v6 counters
- Identifying BGP aggregate contributors in outbound policy
- Support for BGP Large Community
- UDF ACL Support For Mirroring
- uRPF Exceptions
- Security ACL UDF Support
- GRE Tunnel Interface ACL
- Mirroring ACLs with subinterface as source
- Enable 3 colors per tx-queue, ability to configure drop threshold per color & map
- DSCP
- DirectFlow – Drop action
- Decap Group Counters
- BGP Out-Delay Changes/Withdrawals
- IS-IS Clear Commands
- ISIS LSP refresh interval
- FIB compression
- BGP Prefix Independent Convergence(Multi-agent routing protocol mode)
- Replace AS-Path
- IPv4 route scale with 2-to-1 compression of routes
- Symmetric header selection in LAG load-balancing profiles
- OSPF Non Stop Forwarding
- IS-IS Graceful Restart
- BGP Non Stop Forwarding
- Tap Aggregation support for hardware-accelerated sFlow
- OSPFv3 SNMP MIB
- MMU Profile Reservation in Cells
- Two rate three color marker(TrTCM)
- SNMP MIB for MMU Watermark Counters
- Quality of Service on the vEOS router (DPDK mode)
- Configurable coherent Staircase 7% FEC in DCS-7280SRM-40CX2
- Total Ingress MPLS Counters
- IPv4 route scale enhancements
- Federating CVX across multiple Data Centers using BGP-EVPN
- Arista Macro Segmentation Service integration with Fortinet Firewalls
- ContainerTracer

For a full list of features see: <https://eos.arista.com/eos-4-21-3f/>

RFC 4364 BGP MPLS L3 VPN

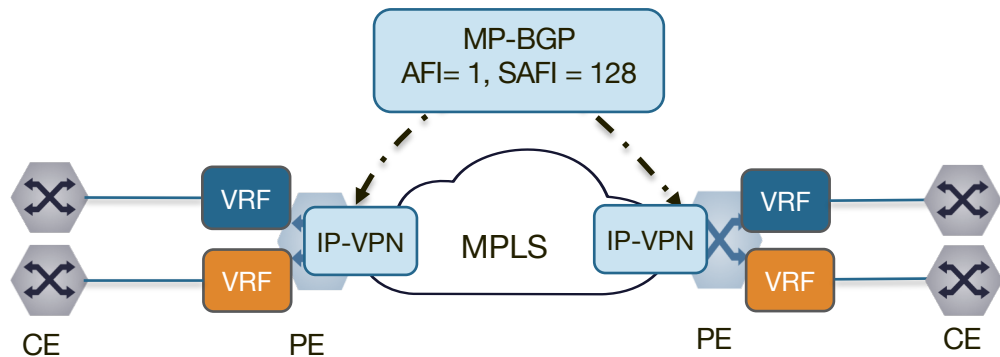
- Use case:
 - Multi-tenant Layer 3 VPNs
 - Brownfield, interop with existing IP-VPN deployments
- EVPN \leftrightarrow IP-VPN config is almost identical

```
route-target import [ vpn-ipv4 | evpn ] 1:1001
```

```
address-family vpn-ipv4
```

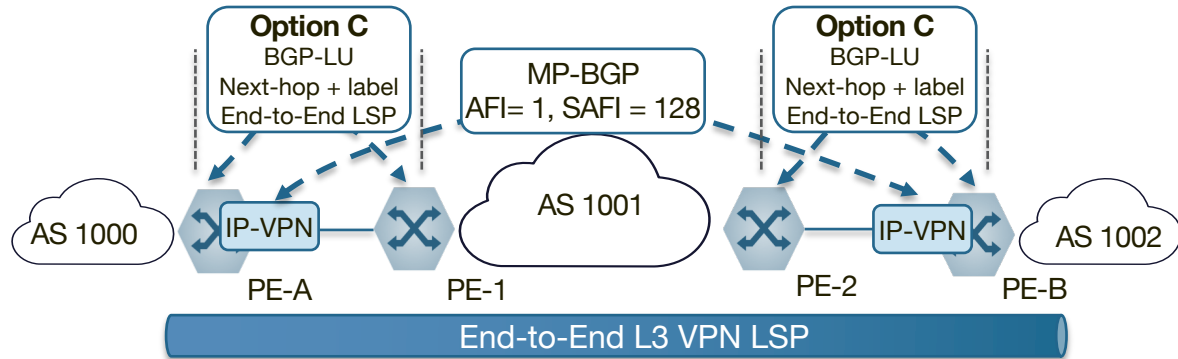
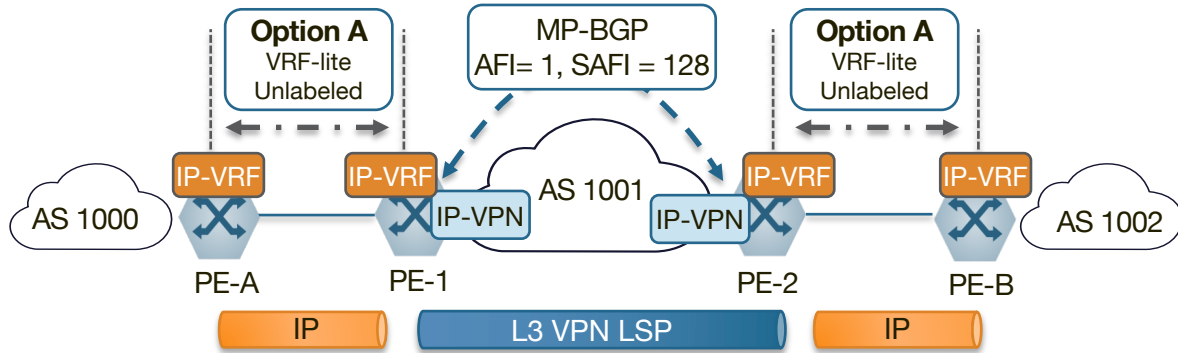
```
neighbor default encapsulation mpls next-hop-self source-interface Loopback0
```

- Platforms: R-series
- Other MPLS features:
 - MPLS-LDP, RSVP-TE
 - ISIS-SR, ISIS-TE, BGP-LU
 - EVPN-MPLS (layer 2/3 VPNs)
 - A-A EVPN for Layer 2 VPNs



Layer 3 VPNs

- PE to CE link, eBGP/static in phase-1
- Inter-AS hand-off:
 - Option A
 - Option C
 - Option B: future
- VRF route leaking



BGP Flowspec

Problem statement

- DDoS
 - Dynamic → types and origins change
 - Distributed → how to reach the edge
 - Difficult to detect → how to inspect?
 - Difficult to regulate → what actions?
- How to do all that?
 - Custom scripting
 - Third Party Provider

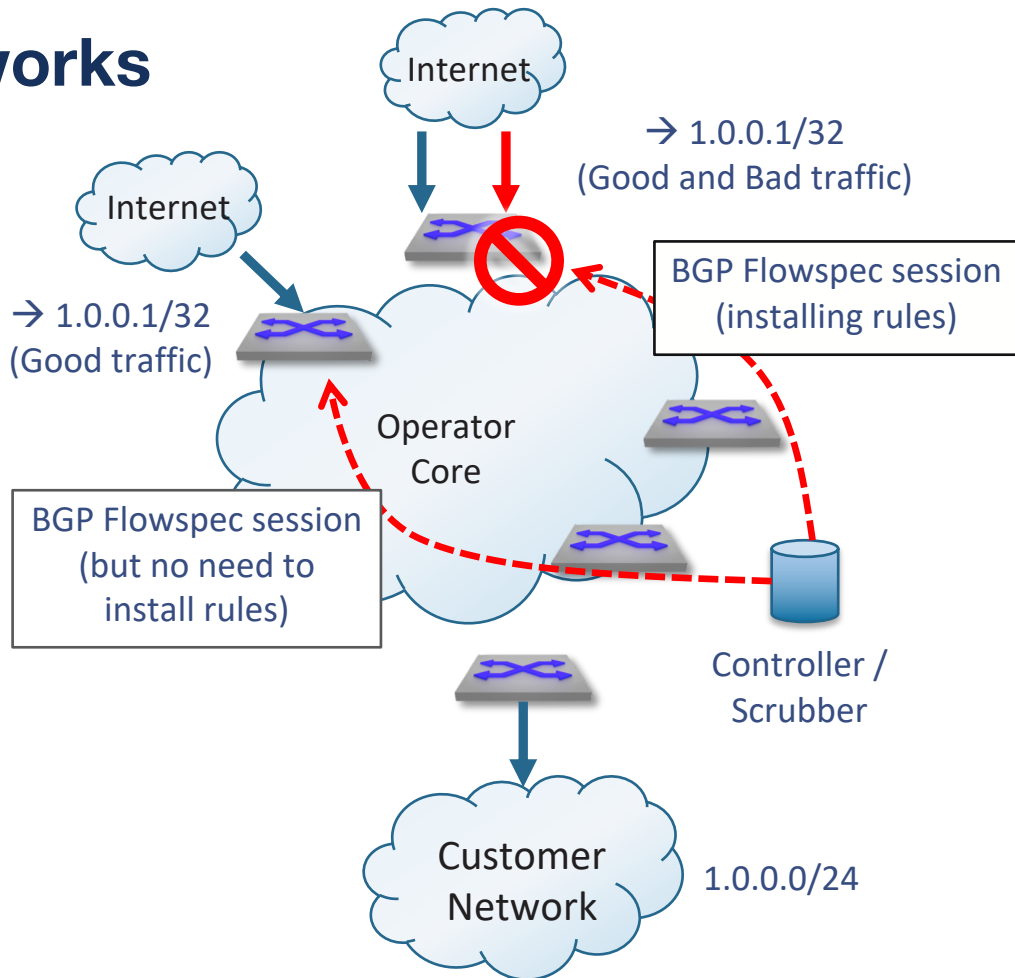
Flowspec Benefits

- Standard way to work against DDoS
 - Redirect traffic (IP Next Hop, VRF)
 - Rate-limit*
 - Drop it
- Dynamic protocol: BGP (New AF)
- Easy to control edge routers with BGP
- Robust
- Cost effective

* mid-2019

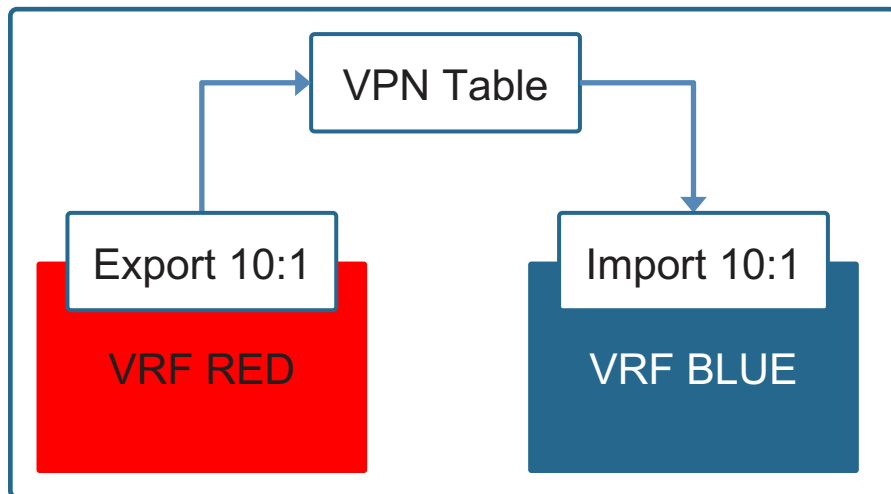
BGP Flowspec – How it works

- Controller / Tool
 - send BGP Flowspec updates
- Rules written in TCAM
 - watch your resources
- One use case:
 1. Redirect traffic to scrubber
 2. Initially rate-limit on the edge
 3. Drop if traffic is excessive



Inter-VRF Local Route Leaking

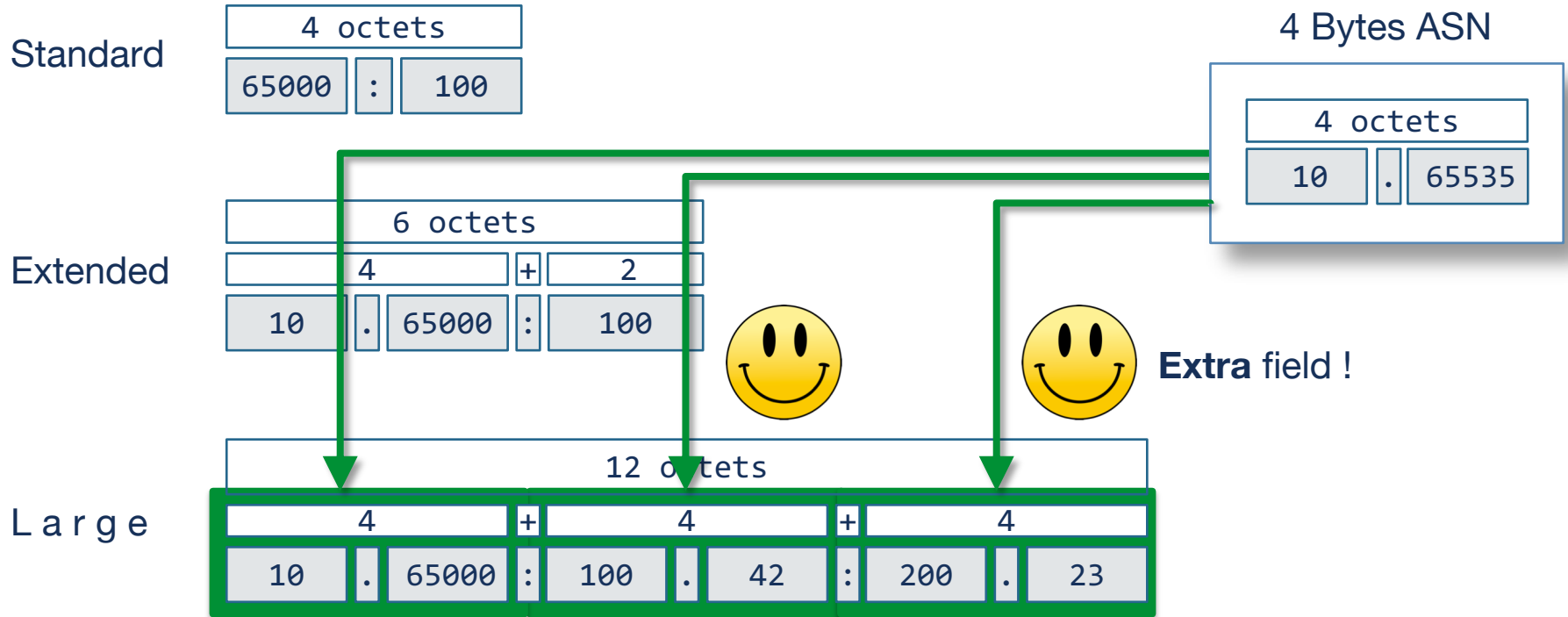
- **Platform:** R-series (7280R/R2, 7500R/R2)
- **Configuration:** simple import/export route-targets



```
router bgp 65001
  vrf RED
    rd 1:1
    route-target export evpn 10:1
  !
  vrf BLUE
    rd 2:2
    route-target import evpn 10:1
```

Optional: route-maps

BGP Large Community



Use case - ASN : Function : Value

The **Function** may be an **information** or an **action**

Function: Info

- 1 = Country
- 2 = Continent
- 3 = Relationship

Function: Action

- 4 = Do not export to ASN...
- 5 = Do not export to country...
- 6 = Prepend Self towards ASN...

Value: Country

- 705 = Slovenia
- 372 = Ireland

Examples

64 : 1 : 705

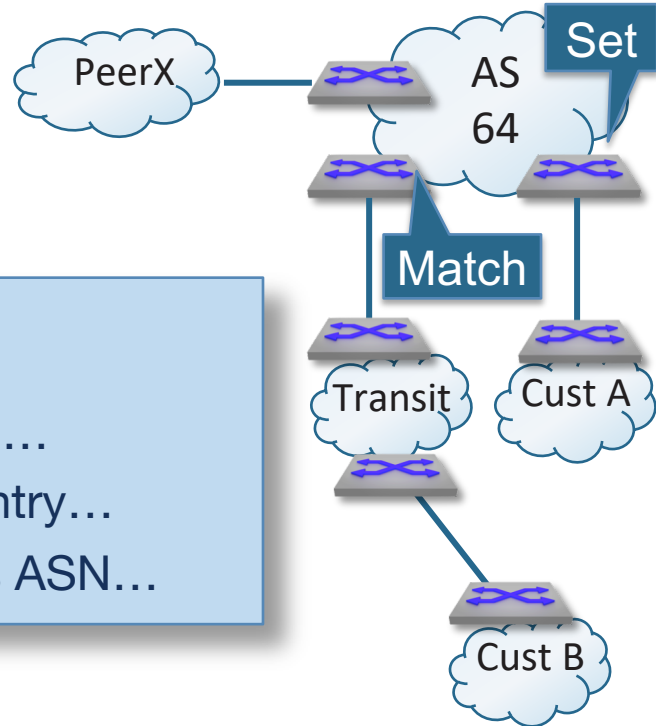
64 : 3 : 1

64 : 4 : 291

Route learnt in Slovenia

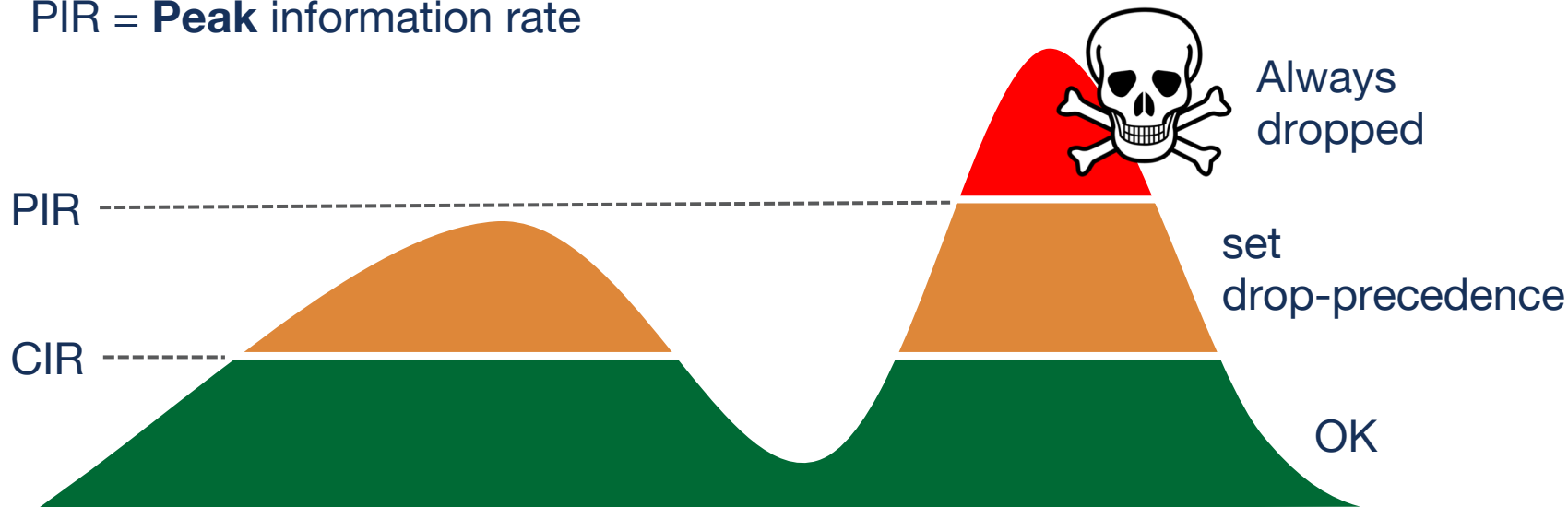
Route learnt from a customer

Do not export route to AS 291



QoS – Two-Rate Three-Colour Marker (TrTCM)

- Platforms: T2, T3 (7050X2, 7050X3, and 2RU or modular variants)
- CIR = **Committed** information rate
- PIR = **Peak** information rate



Miscellaneous Features

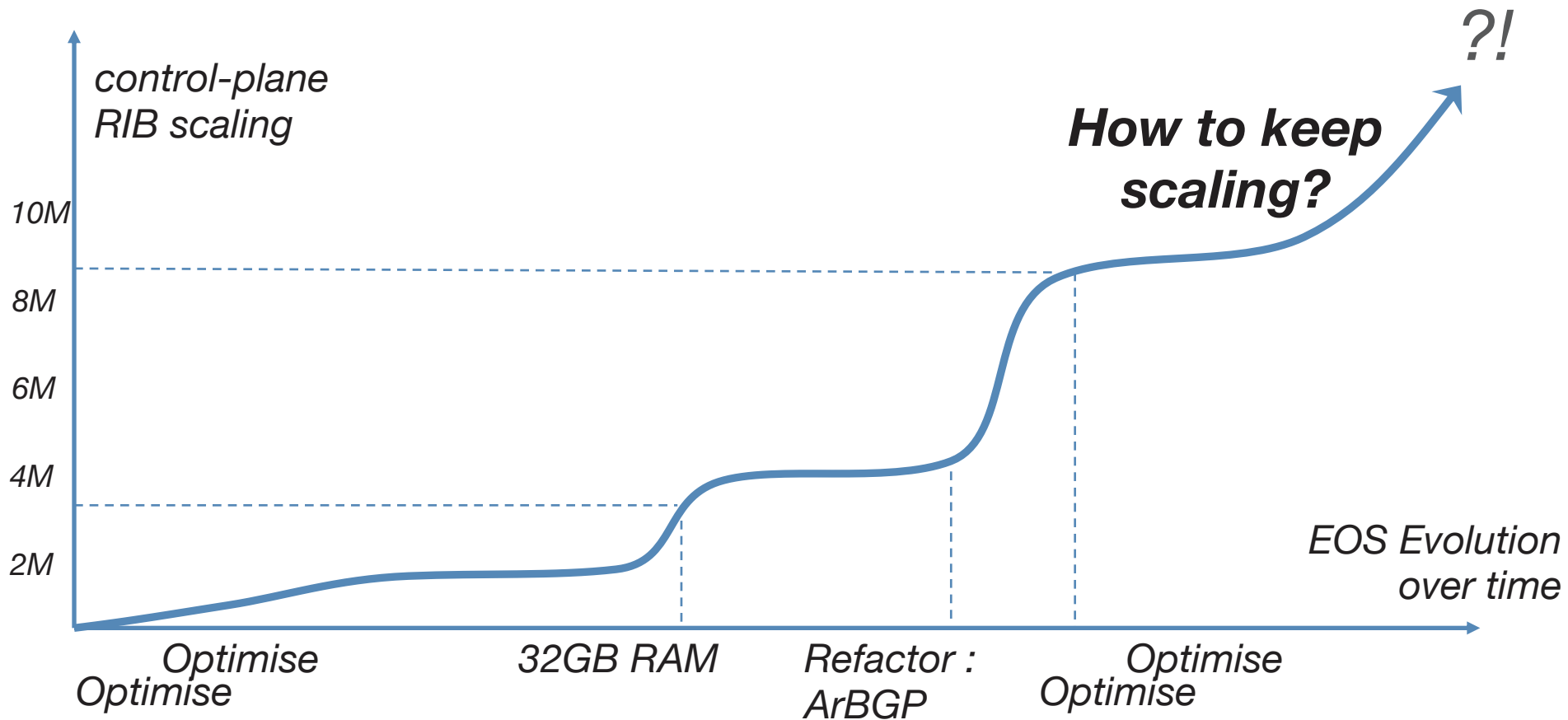
- BGP Missing Policy Action
- T3 Security/mirroring ACL DPI (Deep Packet Inspection)
- DirectFlow Drop action on R-series
- GRE interface (inc ACL) on R-series
- L2 protocol forwarding: +LACP in PW
- VXLAN static + EVPN dual-config
- LANZ mirroring on T3
- ArBGP catch-up
 - Replace AS-path
 - PIM BiDi
 - etc



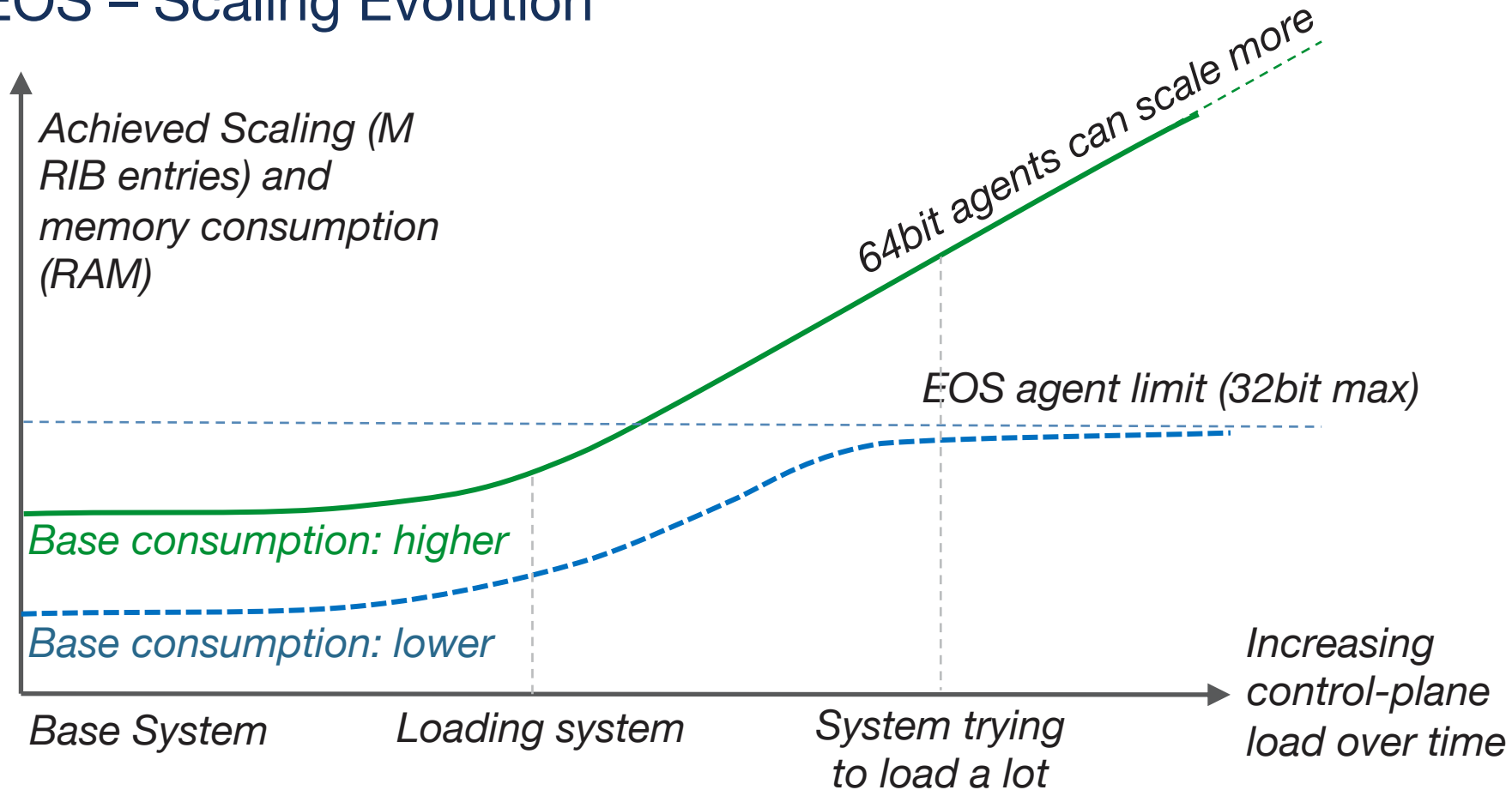
What's New in EOS Update

EOS – Improving Software Scale

EOS – Scaling Evolution



EOS – Scaling Evolution



EOS: 32 bits vs 64 bits

32 bits EOS

- Kernel already 64 bits
 - User-space binaries: 32 bits
 - Base RAM consumption: **lower**
 - Max agent scale: limited to 4 GB
 - Recommended ***either***:
 - For platforms with ≤ 8 GB
- OR**
- If you don't need super-high scale

64 bits EOS

- Kernel already 64 bits
 - User-space binaries: 64 bits
 - Base RAM consumption: **higher**
 - Agents can scale higher > 4 GB
 - Recommended if ***both***:
 - For platforms with ≥ 16 GB (32 GB?)
- AND**
- You need super-high scale

64 bits use case: 7500R/7280R-series with 32GB RAM for Internet peering



What's New in EOS Update

Small CLI changes

What do you prefer?

- VRF


```
interface e5  
  vrf forwarding BLUE
```



```
interface e5  
  vrf BLUE
```

- BGP examples

```
neighbor peer-group  
neighbor fall-over bfd
```



```
neighbor peer group  
neighbor bfd
```

Details with a BGP example

New

```
Arista(config-router-bgp)#neighbor 1.1.1.1 peer group ACME
!  
router bgp 123  
  neighbor 1.1.1.1 peer group ACME
```

Details with a BGP example

New

```
Arista(config-router-bgp)#neighbor 1.1.1.1 peer group ACME
!  
router bgp 123  
  neighbor 1.1.1.1 peer group ACME
```

Old

```
Arista(config-router-bgp)#neighbor 1.1.1.1 peer-group ACME
!  
router bgp 123  
  neighbor 1.1.1.1 peer-group ACME
```

Details with a BGP example

New

```
Arista(config-router-bgp)#neighbor 1.1.1.1 peer group ACME
!  
router bgp 123  
  neighbor 1.1.1.1 peer group ACME
```

Old

```
Arista(config-router-bgp)#neighbor 1.1.1.1 peer-group ACME
!  
router bgp 123  
  neighbor 1.1.1.1 peer-group ACME
```

Convert

```
Arista#configure convert new-syntax  
!  
router bgp 132  
  neighbor 1.1.1.1 peer group ACME
```

← Manual conversion
(one off)

Timeline

- 4.21.4
 - First hybrid / migration release
 - Old + New commands are accepted
 - Command to manually convert (one off): **configure convert new-syntax**
 - Old commands are still accepted and saved as-is, even after the conversion
 - need to convert again
- 4.22.x
 - No change
- 4.23 (August 2019)
 - Old configs will automatically be converted to the new syntax
 - Old syntax will **not** be accepted (CLI or APIs)

Tips

Can you miss something?

- No worry
- 4.23 will convert everything

CVP configlets – options:

- Reconcile
- Update configlets manually
- Conversion script exists

Automation system to update?

- Simple steps to check:

1

```
copy run start
```

2

```
configure convert new-syntax
```

3

```
diff run start
```

For full details see Arista Field Notice #39:

<https://www.arista.com/en/support/advisories-notices/fieldnotices/7097-field-notice-39>



What's New in EOS Update

EOS - Software Management

How to select an EOS version

- 2 GB image for older models (long life models: 7150, ...)
- Consider 32 bits vs 64 bits for scale
- Standard version now includes both CoPP & PDP
 - International version: still needed for PVLAN
- Choose an EOS train:
 - **Stability:** 4.20 (has reached the “M” milestone: Maintenance-only)
 - Latest **features:** 4.21 (“F” stage: new features introduction)
- Choose a Release:
 - **Latest** in the train (best practice)
 - 4.20.12M
 - 4.21.5F
- These are general guidelines, not necessarily applicable to 100% cases
 - In doubt, ask your Arista Systems Engineer

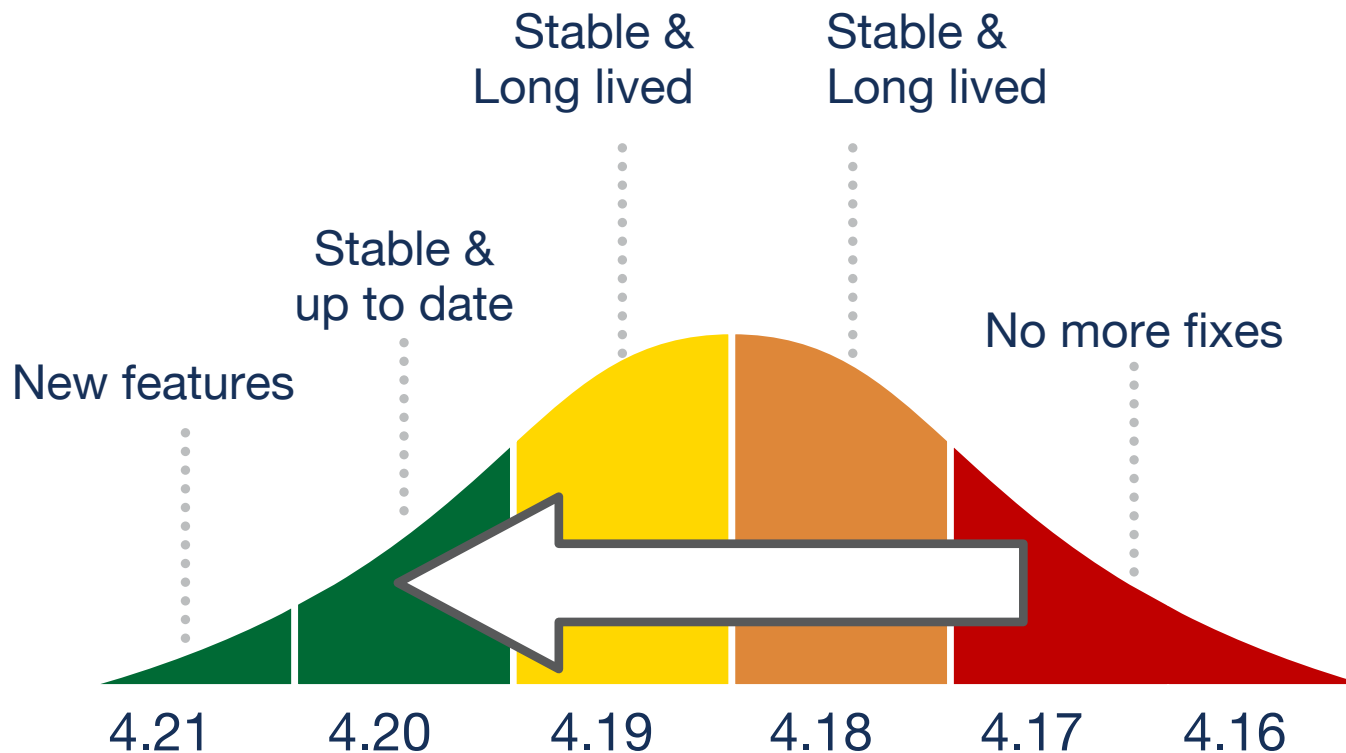
Software Management – EOS status

- 4.21: Actively **developed** (F: new Features introduction)
- 4.20: Actively **maintained** (M: Maintenance-only, bug fixes)
- 4.19: TAC support. **No more bug fixes**
- 4.18: TAC support. **No more bug fixes**
- 4.17: No support anymore
- 4.16: No support anymore
- 4.15: No support anymore

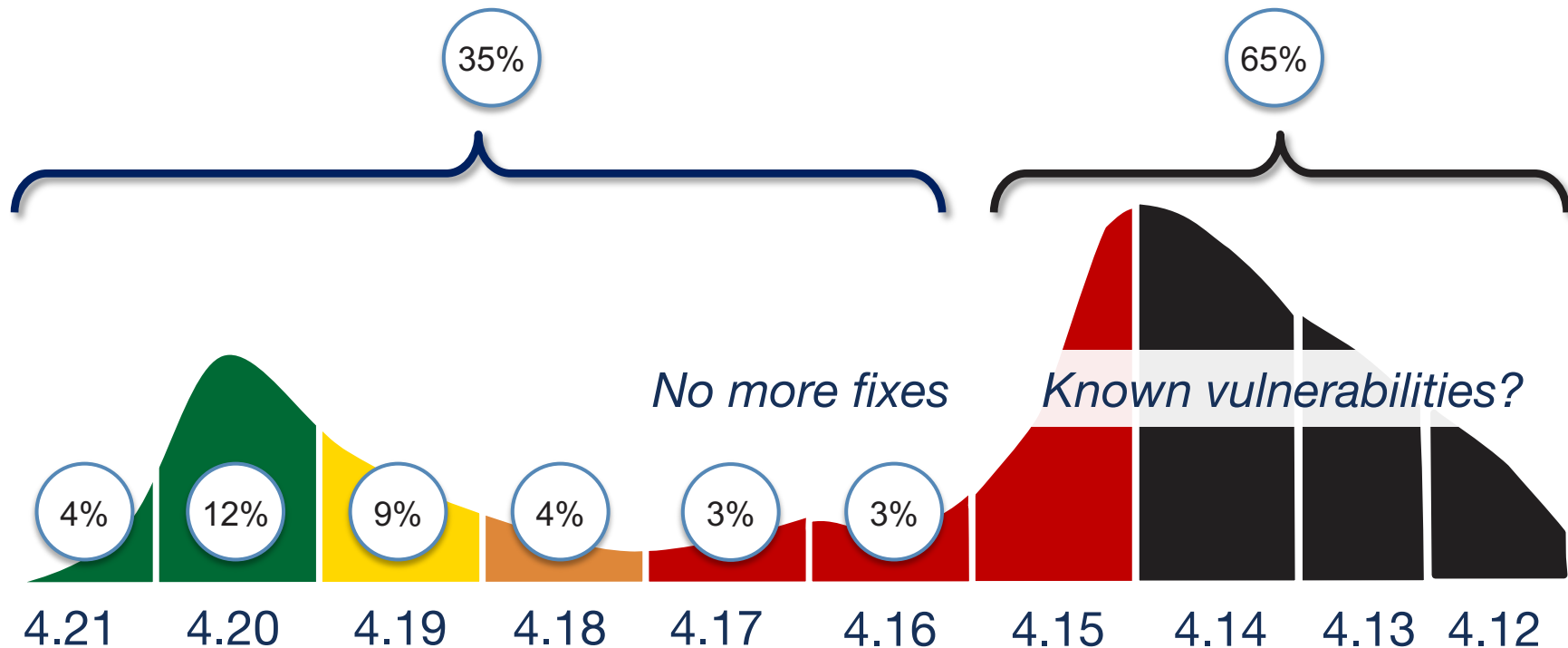
What to upgrade to?



Note: 4.22
coming in
few months



EOS version distribution – 2019 TAC cases statistics



Make upgrades easier - Automate

- Upload new images
- MD5 check
- Pre-snapshot
- Enter maintenance mode (Spine-SSU)
- Upgrade
- Exit maintenance mode
- Post-snapshot
- Snapshot diff

Snapshot Summary

Metric	Snapshot 1	Snapshot 2	Changed
Num of Interfaces	58	58	
Num of Vlans	5	5	
Num of LLDP Neighbors	10	10	
Num of MAC Table Entries	38	38	
Num of Arp Entries	20	20	
Num of Eth Interfaces	52	52	
Num of Eth Interfaces Up	13	13	
Num of Eth Interfaces Dwn	39	39	
Num of Eth Interfaces Other	0	0	
Num of Vlan Interfaces	3	3	
Num of Vlan Interfaces Up	3	3	
Num of Vlan Interfaces Dwn	0	0	
Num of Vlan Interfaces Other	0	0	
Num of disabled MLAG ports	0	0	
Num of partial-active MLAG ports	0	0	
Num of inactive MLAG interfaces	0	0	
Num of configured MLAG interfaces	0	0	
Num of fully active MLAG interfaces	1	1	
Num of BGP Neighbors	0	0	
Num of BGP Neighbors Estab	0	0	
Num of BGP Neighbors Active	0	0	
Num of BGP Neighbors Other	0	0	

Time saving:





Conclusion

Conclusion

- Look up the new features (TOI)
- Do more with EOS!
- Schedule your upgrades



Thank You