EXTREME ACADEMY
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Behind-the-Scenes at KICK Sauber F1 with Extreme Academy

Powering a Racing Team Part 1 – A Network to support Multicast

Join the Extreme Academy team as we follow the KICK Sauber F1 Team on their journey throughout the racing season! Extreme Networks is powering the KICK Sauber F1 Team's operations with Wi-Fi 6E and network analytics, providing cutting-edge technology that is revolutionizing the way the team operates.

In this free technical training session, our panel delve into the high-performance networking environment demanded by F1 Teams and the technologies that support their operations both on and off the racetrack.

We will also talk about the partnership between Extreme and KICK Sauber F1 as the racing season kicks off in Asia with insight into technical training on Multicast and how it is used in the world of F1 motor racing, this was broadcast April 11, 2024, at 8 am BST / 4 pm SGT.

Watch here: https://www.extremenetworks.com/resources/training/kick-sauber-f1-with-extreme-academy-part-1

From this training you will understand:

- The definition of Multicast and its common uses
- The legacy approach to Multicast service provision and the limitations
- Multicast for high performance and demanding environments using Extreme Fabric

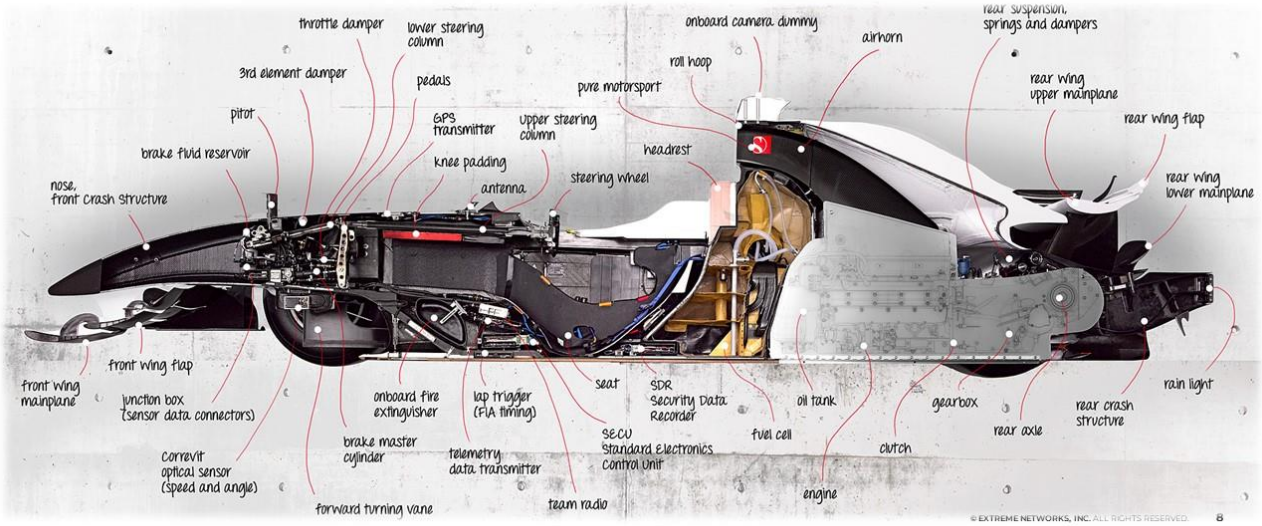
Speakers

Rohan Abey
Senior Director of Training and Sales Enablement

Marco Mautone
Senior Director of EMEA Marketing

Roy Verboeket
VP of Sales Engineering International Markets

Mina Mousa
Head of Systems Engineering, ANZ



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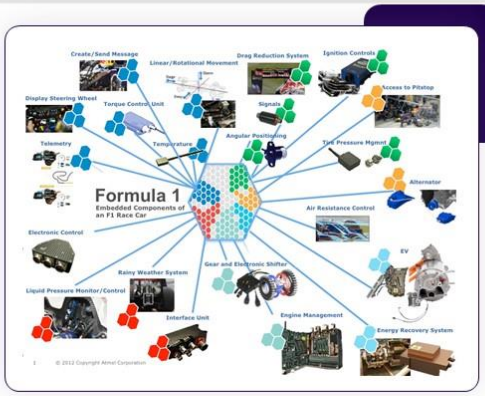
CONNECTED = INFORMATION = DRIVING DECISIONS

F1 Cars at the Start:
- Equipped with over 300 sensors
- Technological advancements have increased sensor counts.

Sensor Usage in Testing:
- Up to 600 sensors including Pitot probes.

Data & Simulations:
- The Average F1 Car generates 100.000 data points per second
- Tens of millions of simulations per round for vehicle optimization
- 1.5 terabytes of data generated per race weekend, per car

Engine & Component Monitoring:
- Three engine types: Combustion and two electric motors.
- Additional components: Turbo, battery, and control unit.
- Hundreds of sensors for:
  - Temperature
  - RPM (Revolutions Per Minute)
  - Flow rate
  - Pressure
  - Air pressure
  - Vibrations
  - Voltage



Additional Monitoring:
- Tires, underbody, and GPS positioning.
- Acceleration, braking, and differential.

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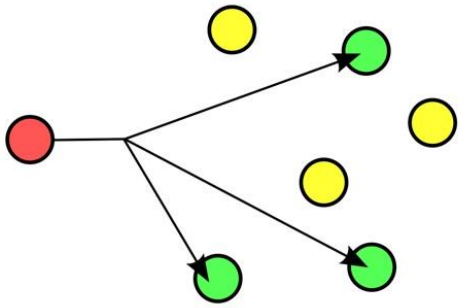
DEFINITION OF MULTICAST

In computer networking, multicast is group communication where data transmission is addressed to a group of destination computers simultaneously. Multicast can be one-to-many or many-to-many distribution



Source: Wikipedia

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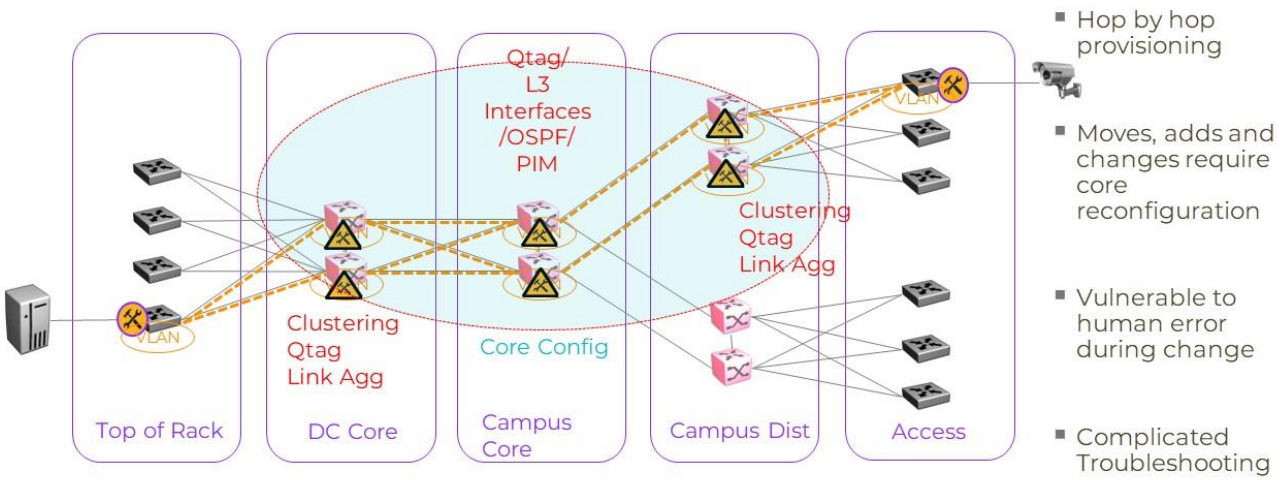
TRADITIONAL NETWORK: LEGACY SERVICE PROVISIONING



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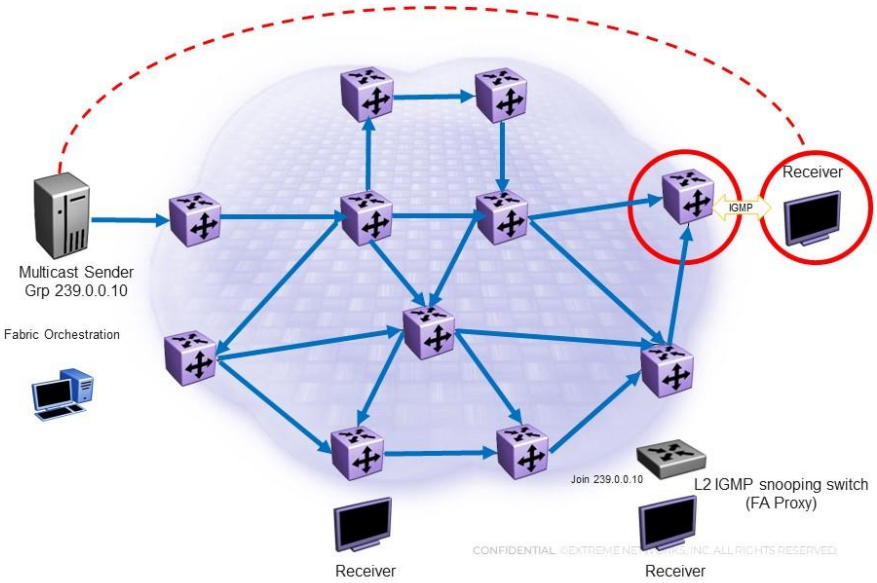
MULTICAST ROUTING USING PIM DENSE

- We have a receiver that wants to receive some traffic and so it sends an IGMP send request to its connected switch
- In a dense mode deployment, the stream is going to be sent into **EVERY** single link and switch in the topology, so the traffic gets **flooded** everywhere
- Not scalable
- Complex config for every router and every interface/uplink
- Fully depending on IGP to ensure loop free routing



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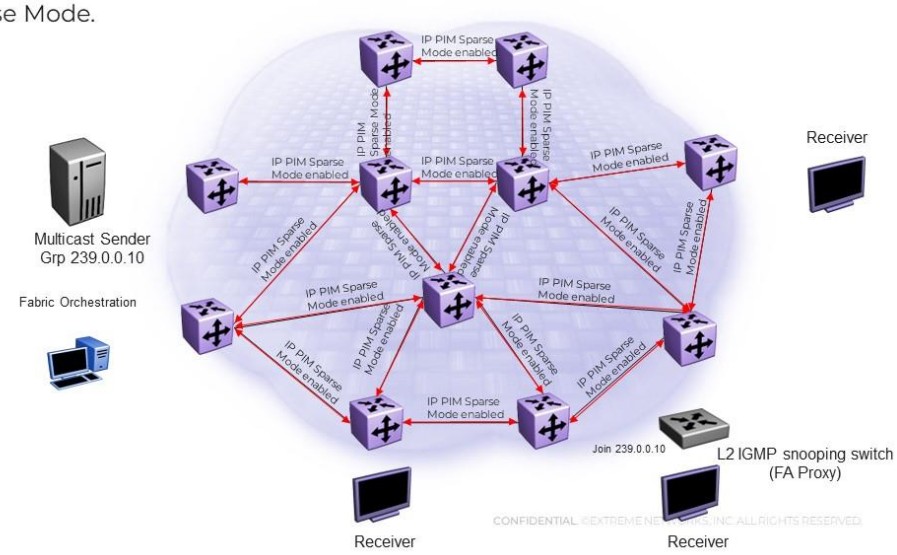
MULTICAST USING SPARSE MODE

- Sparse Mode is much more Scalable when compared with Dense Mode.

Sparse Mode Operation

Discover PIM Neighbours

- Every Router needs to discover its PIM neighbour hello every 30 sec



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MULTICAST USING SPARSE MODE

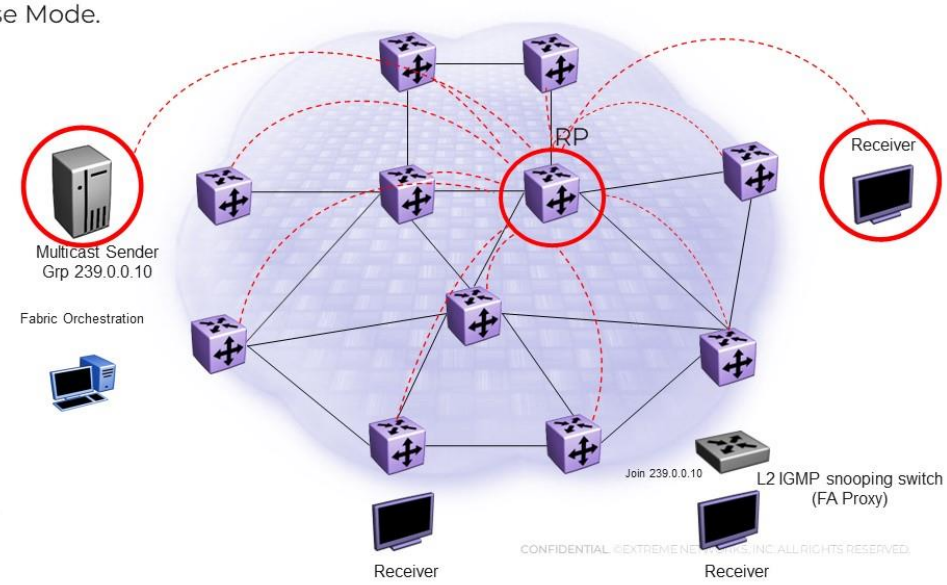
- Sparse Mode is much more Scalable when compared with Dense Mode.

Sparse Mode Operation

Discover the Root of the Tree (RP)

- Every router should learn about the RP
- The RP is going to provide the information about the source to the destination
- The RP can be manually configured using some commands on every router or using dynamic RP configurations

- Not scalable
- Complex config for every router and every interface/uplink
- Fully depending on IGP to ensure loop free routing
- Depending on the RP



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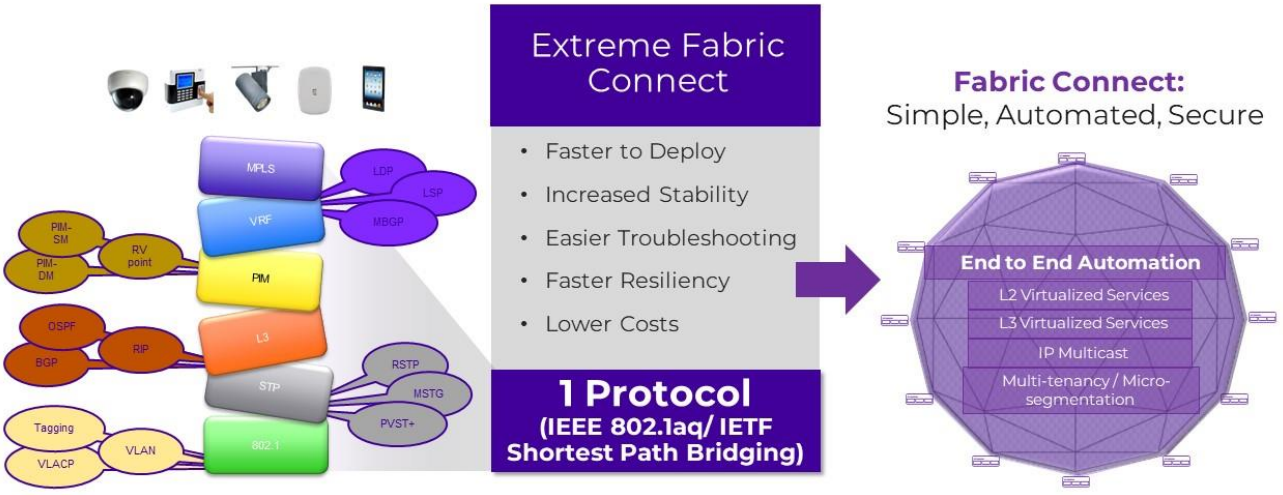
EXTREME FABRIC IS SIMPLE



Traditional Networks
(Complex, Slow, Time and Effort, Human Errors)

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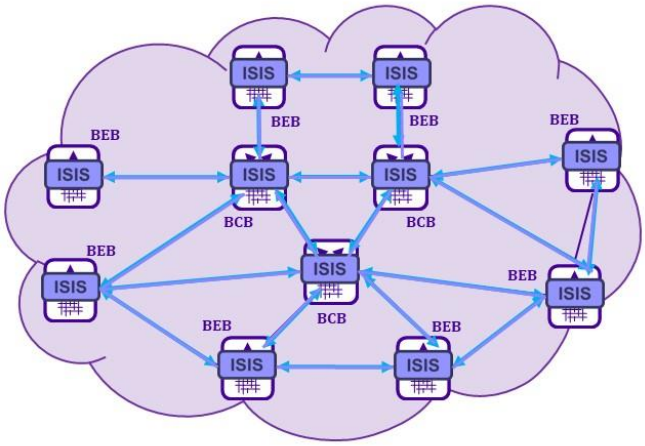
FABRIC CONNECT – SIMPLICITY IN ACTION



- Fabric Provisioning - **True plug and play** infrastructure deployment
- **Self-forming** and **self-provisioning** of a Fabric by just interconnecting "out of the box" switches [no manual intervention] **controllerless Fabric**
- Fabric is **topology independent** and easily **scales without dependency**

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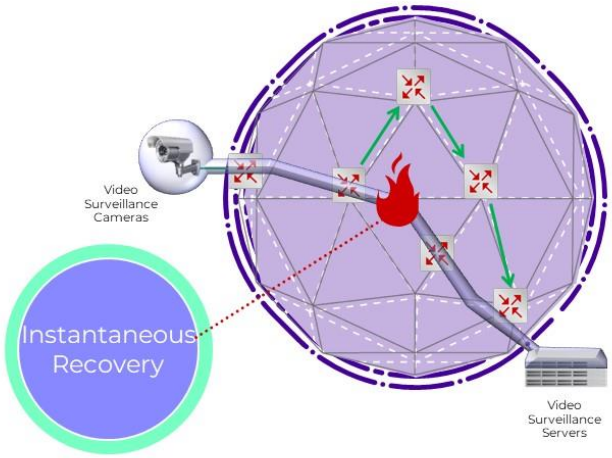
EXTREME FABRIC IS RESILIENT

Delivering Faster Network Recovery (from mins to milliseconds)



- Load balanced, active / active network
- Full network recovery in milliseconds (L2/3, even multicast)
- Eliminates the domino effect of protocol overlays
- Recovers so quick that upper layer communications protocols are unaffected.

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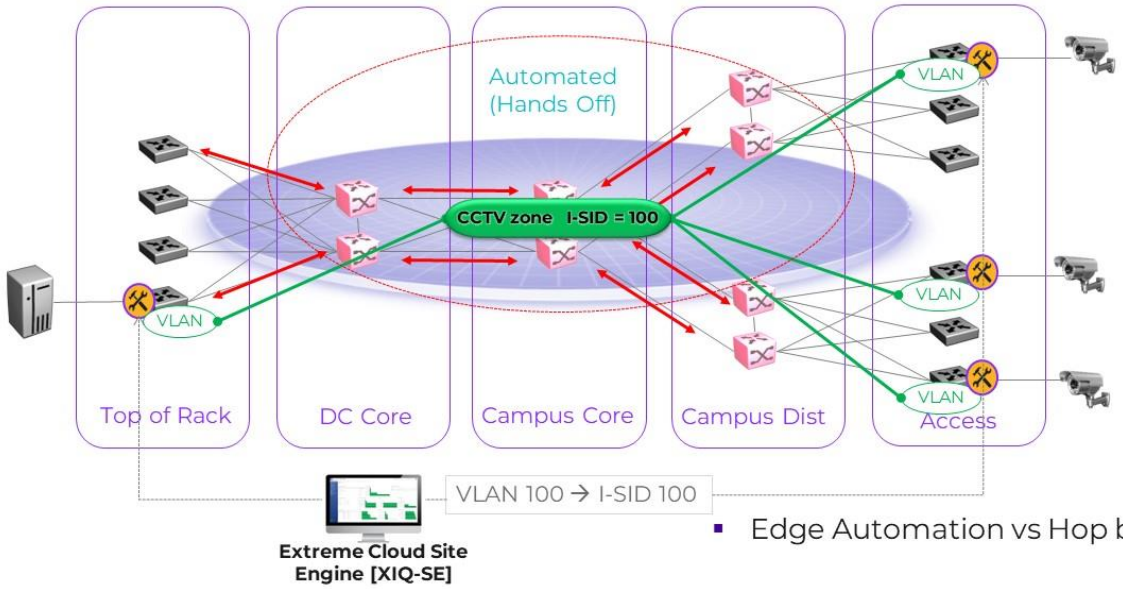
FABRIC CONNECT – SERVICE PROVISION



- Edge Automation vs Hop by Hop

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THE BEST PERFORMING IP MULTICAST NETWORK

A multicast stream received at the edge of the fabric mapped into a dedicated multicast Service

Simplicity : No PIM or DVMRP.

Efficiency: The stream is not forwarded until a receiver requests it and is forwarded ONLY to those receivers who request it

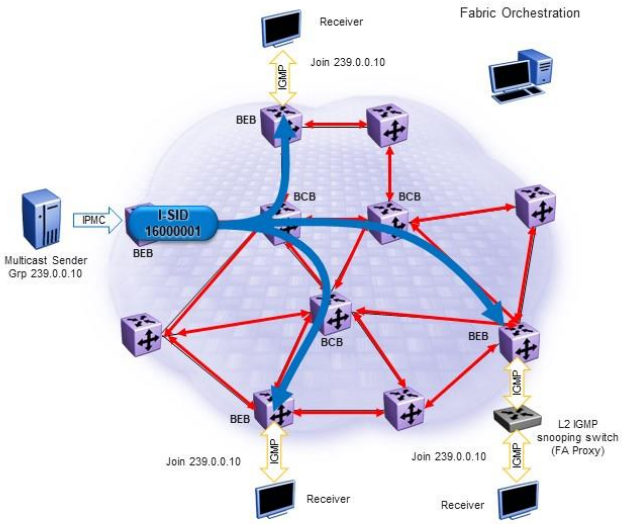
Resilience: Underling fabric reacts to switch or link failures in sub 200 milli-seconds.

Flexibility: No topology dependency, support rings, meshes..

Scalability: Scale to the 10's of thousands streams

Interoperability: With PIM/IGMP

Virtualization: support Multi-tenancy



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