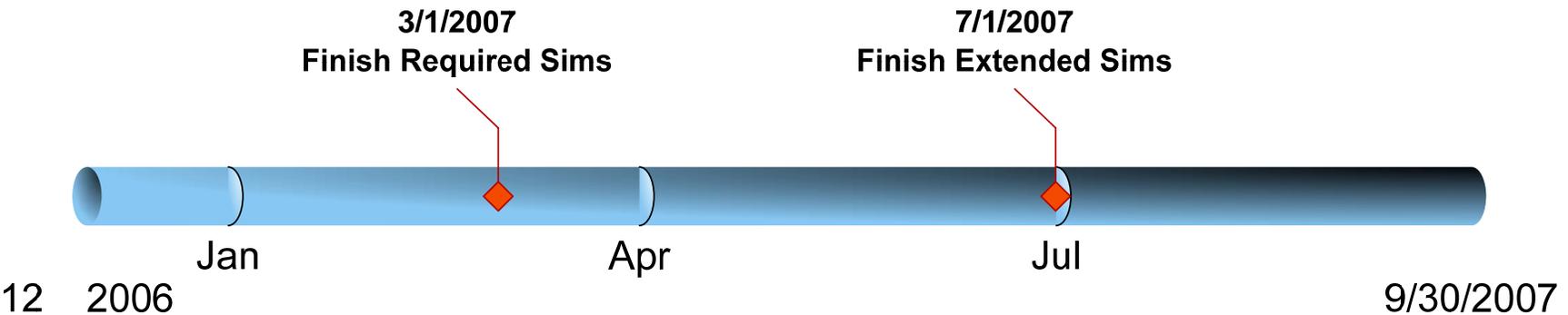




CN-SIM: Topologies and Workloads

Manoj Wadekar

Timeline

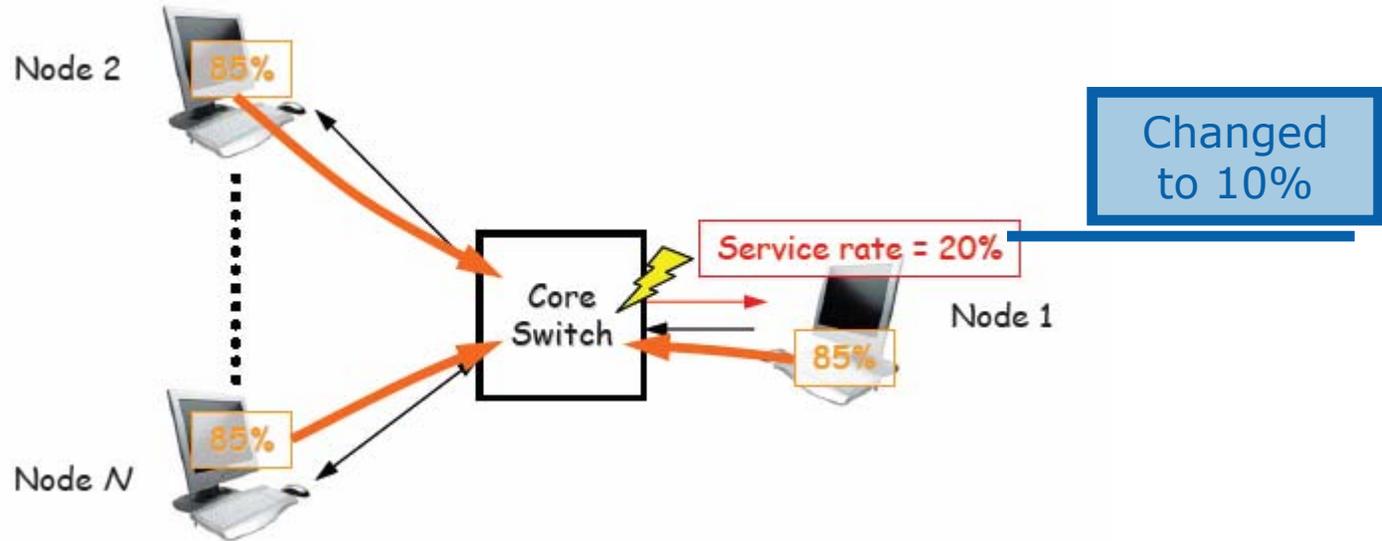


- Define "Required Sims"
- Define "Extended Sims"
- Multiple presentations from Mitch Gusat (IBM), Prof. Jain for setting up the Benchmark
- Need to decide "Required" vs. "Extended"

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1. Output Generated Hot Spot Single Stage



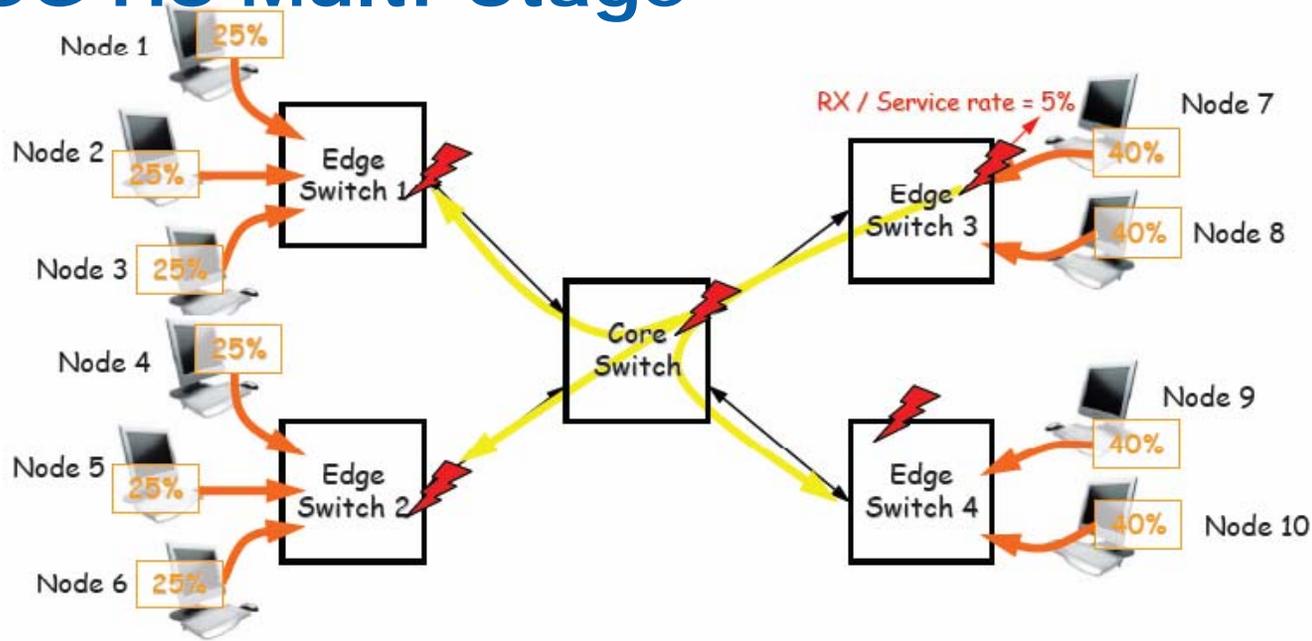
Workload:

- All Nodes (10) : Uniform Distribution, load = 85% (8.5Gbps)
- Node 1 Service Rate = 10%
- One Congestion Point
 - Hotspot:
 - Degree: 9, Severity = 8.5:1,
 - Duration: 80 mS from $t_i=10$ to 90 mS
 - All Flows affected

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Required

2. OG HS Multi-Stage



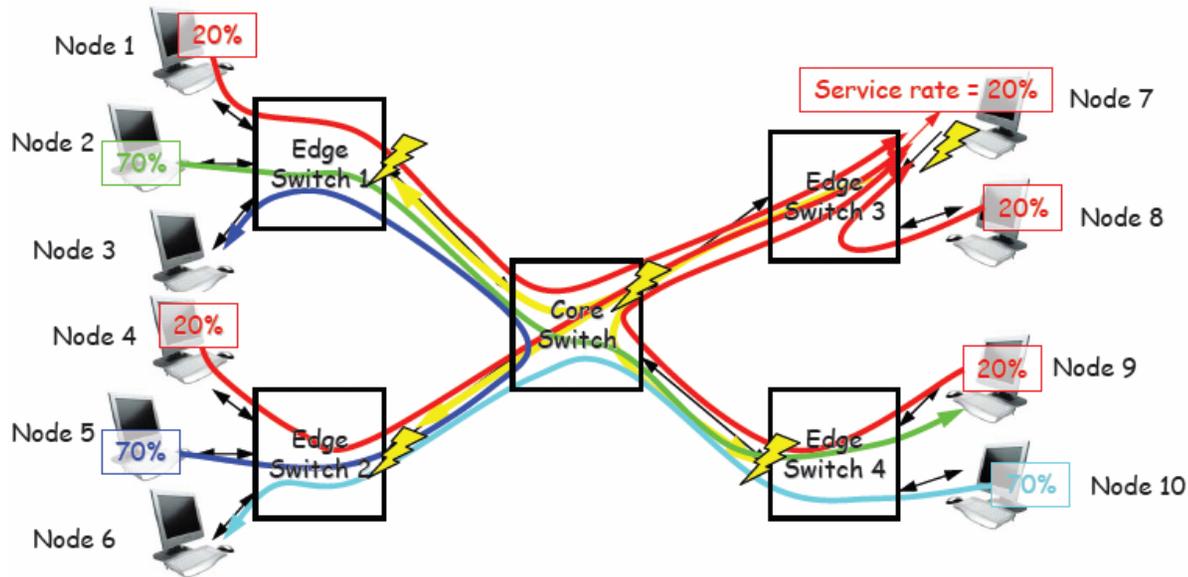
Workload:

- All: Uniform distribution traffic (background traffic)
- Nodes 1-6: 25% (2.5Gbps), Nodes 7-10: 40% (4 Gbps)
- Primary Hotspot:
 - Node 7 service rate = 5% (Rx only)
 - If saturation tree spreads => 5 congestion points total

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Required

3. OG HS Multistage: Selected Victims



Workload:

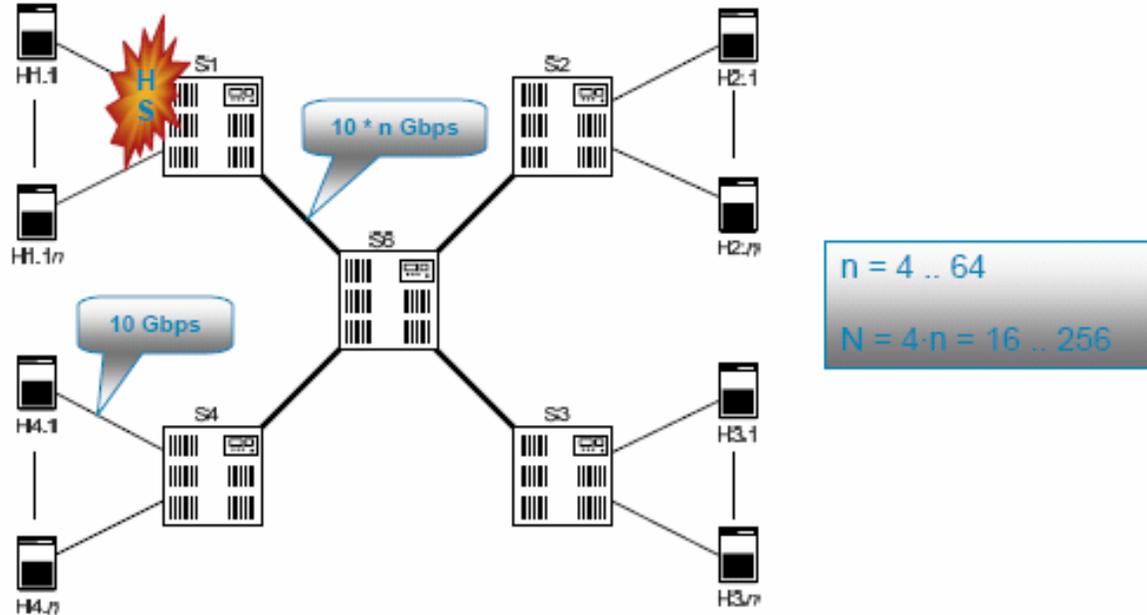
- Four culprit flows of 2 Gb/s each from nodes 1, 4, 8, 9 to node 7 (hotspot)
- Three victim flows of 7 Gb/s each: node 2 to 9, node 5 to 3, node 10 to 6
- Node 7 service rate = 20%
- Five congestion points, All switches and all flows affected
- Fair allocation provides 0.5 Gb/s to all culprits and 7 Gb/s to all victim

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Required



4. Multistage Single HS Large Network



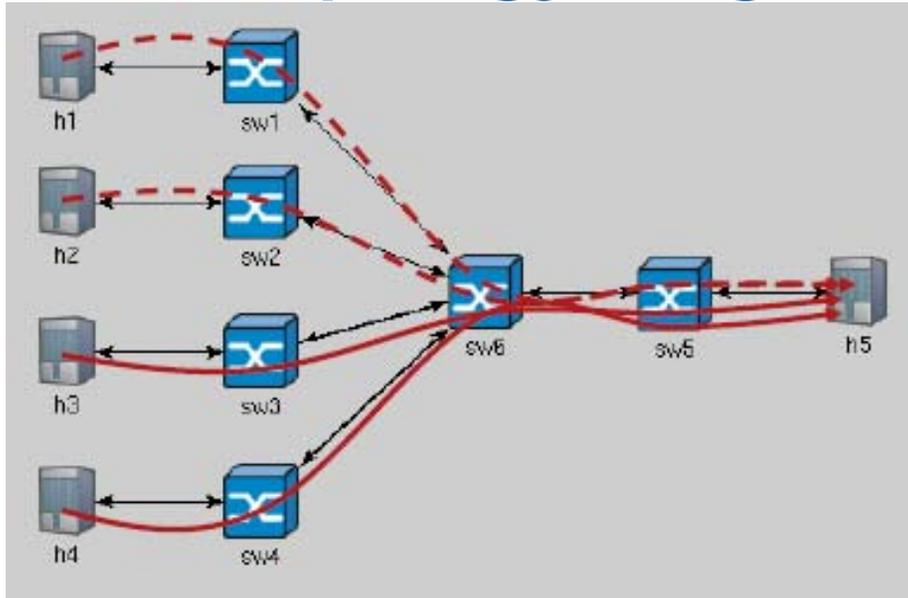
Workload:

- Load: H1.1 -- H4.n $\lambda = 85\%$, Skewed Uniform
 - H1.1 is targeted with 2λ
 - All other nodes with $\lambda (N-2)/(N-1)$
- Congestion Point:
 - Node H1.1
 - HS degree = N
 - HS severity = 1.7 : 1

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Required

5. Symmetric Topology Single HS – Bursty



Workload:

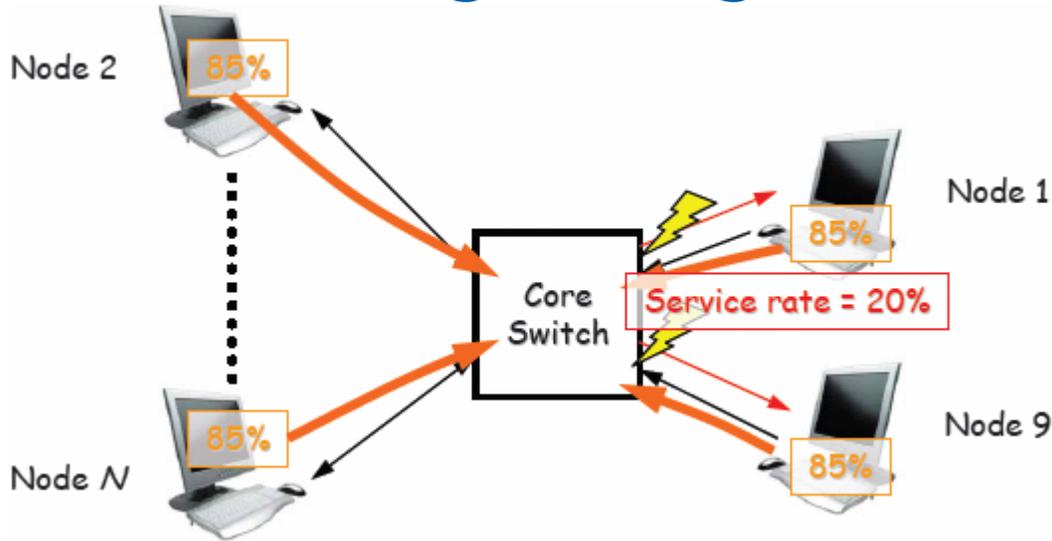
- Point-to-point from h1-4 to h5
- Load: 100%
- H1 and H2 on-off sources ($T_{on} = T_{off} = 20 \text{ ms}$)

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Required



6. OG Dual HS Single Stage



Workload:

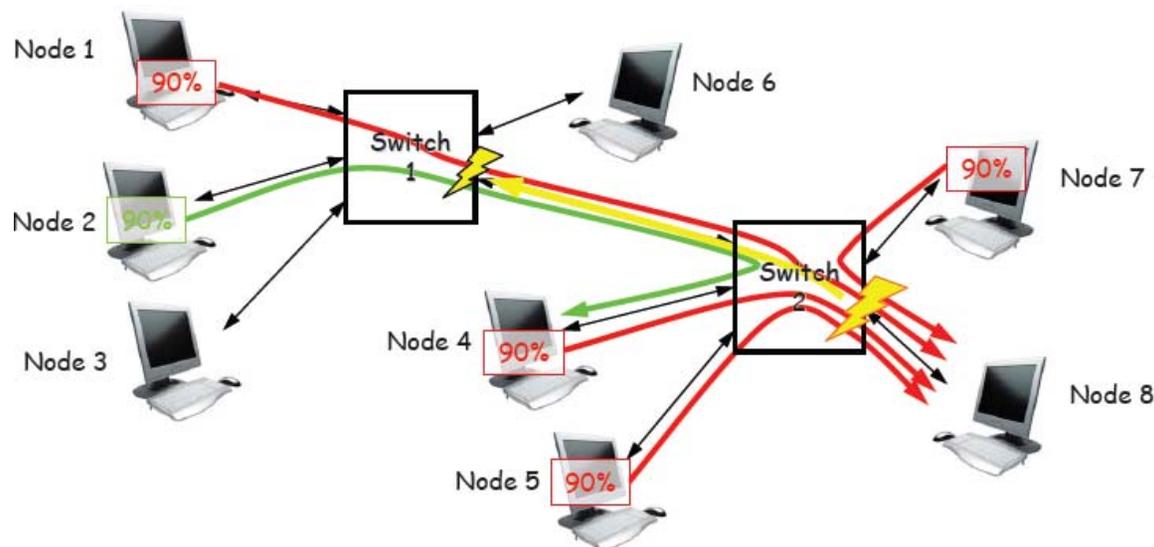
- All nodes (10): Uniform destination distribution, load = 85% (8.5 Gb/s)
 - Node 1 and node 9 service rate = 20%
- Two congestion points
 - Hotspot degree = $N-1$
 - All flows affected

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Required?



7. Multistage Dual HS (Light & Heavy)



Workload:

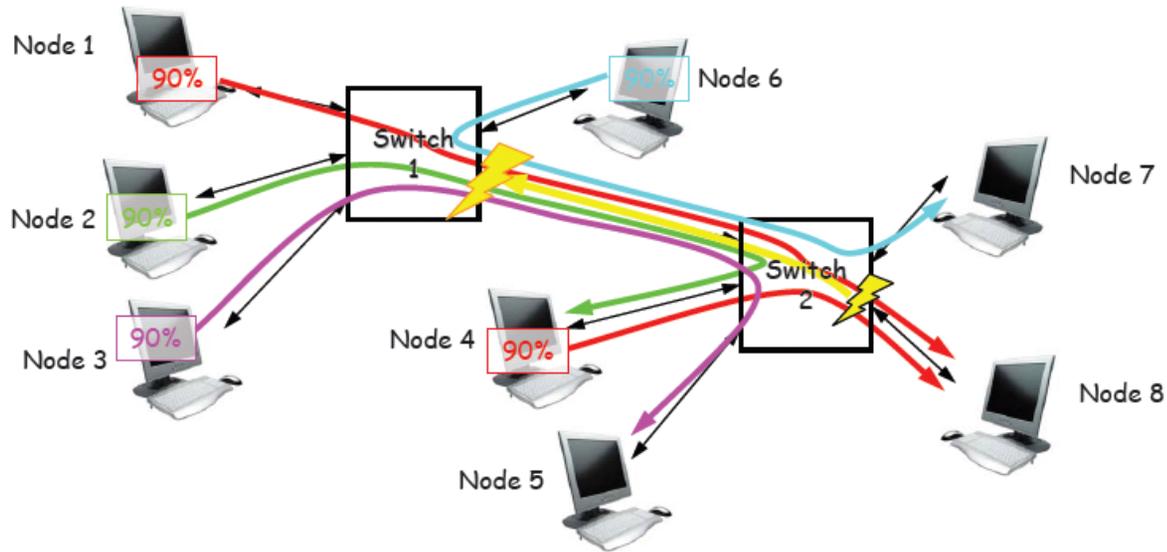
- Two switches, all links 10 Gb/s, no background traffic
- Four flows of 9 Gb/s each from nodes 1, 4, 5, 7 to node 8
- One flow of 9 Gb/s from node 2 to node 4
- Two congestion points
 - Port from switch 1 to switch 2
 - Port from switch 2 to node 8
- Fair allocation should provide 2.5 Gb/s for all flows to node 8 and 7.5 Gb/s for flow to node 4

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Extended?



8. Multistage Dual HS (Heavy & Light)



Workload:

- Two switches, all links 10 Gb/s, no background traffic
- Two flows of 9 Gb/s each from nodes 1 and 4 to node 8
- Three flows of 9 Gb/s each from node 2 to node 4, 3 to 5, and 6 to 7
- Two congestion points
 - Port from switch 1 to switch 2
 - Port from switch 2 to node 8
- Fair allocation should provide 2.5 Gb/s for all flows to switch 2 and 7.5 Gb/s for flow from node 4 to node 8

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Extended?



To be added

- Metric
- Algorithm Parameter Definitions

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