



# IEEE 802.1Qbp: Hash Proposal Update

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# Agenda

- Overview
- Hash Functions Evaluated
- Review Results
- Observations

# Goals

- Identify hashing strategies that provide good flow distribution for multi-hop networks in a deterministic manner

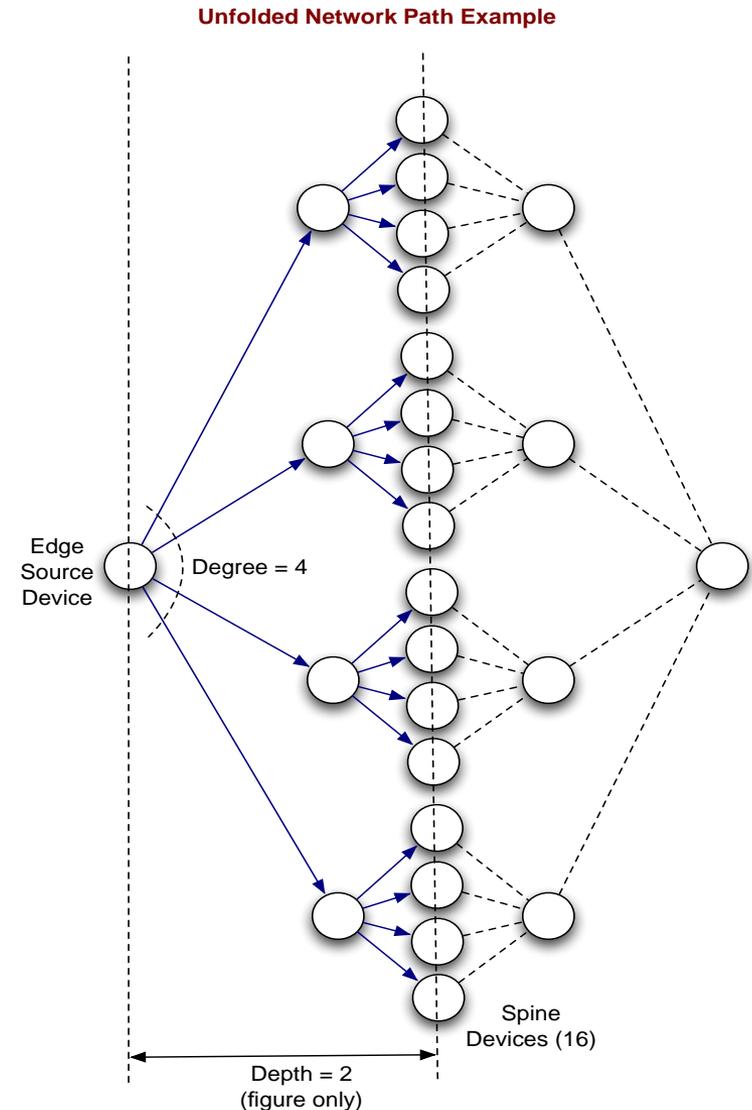
# Evaluating Load Balancing Performance

## Approach

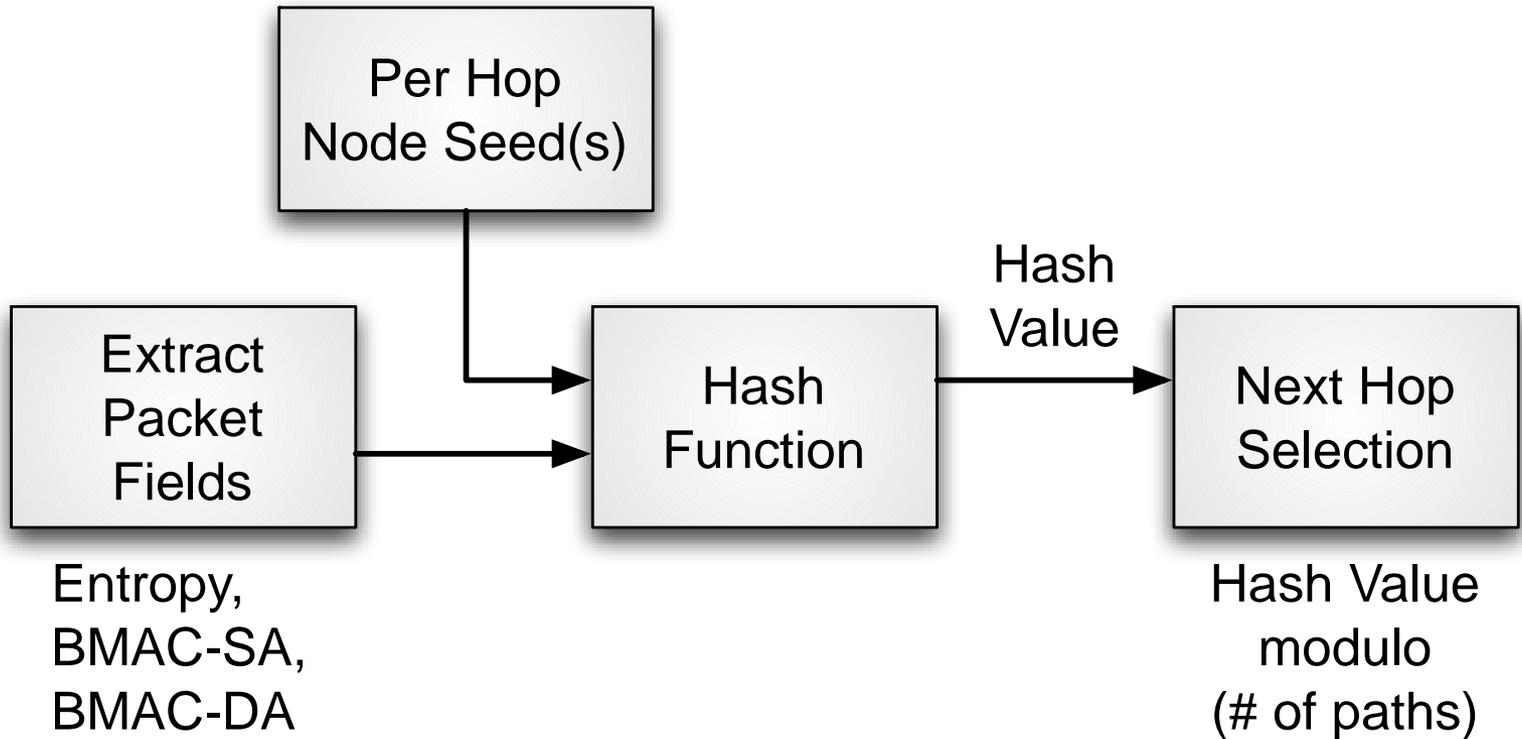
- Transmit flows from Edge source device (root node) and measure flow distribution across spine devices
- Evaluate an N-ary tree with a degree of 4 and variable depth
  - **Option #1:** Depth = 2 hops
  - **Option #2:** Depth = 3 hops
  - **Option #3:** Depth = 4 hops

## Measure

- Standard deviation of flows received at the spine devices



# Next Hop Selection Data Flow



# Hash Input Fields

- Entropy (16-bit)
- Per-hop Node Seed
- BMAC SA
- BMAC DA

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# Hash Functions Evaluated

- **FNV-16**

- FNV32 with 32-bit output folded using XOR of:
  - Hash Value[15:0]
  - Hash Value[31:16]
- Offset-basis: 0x811c9dc5
- Octets of Data:
  - Entropy (2 octets)
  - Node Seed (2 octets)
  - BMAC SA (2 octets)
  - BMAC DA (2 octets)

# Impact of Tree Depth Evaluation

- **Topologies**

- Use an N-ary tree with Degree = 4:
  - **Option #1:** *Depth = 2 hops*
  - **Option #2:** *Depth = 3 hops*
  - **Option #3:** *Depth = 4 hops*

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# Topology Test Setup

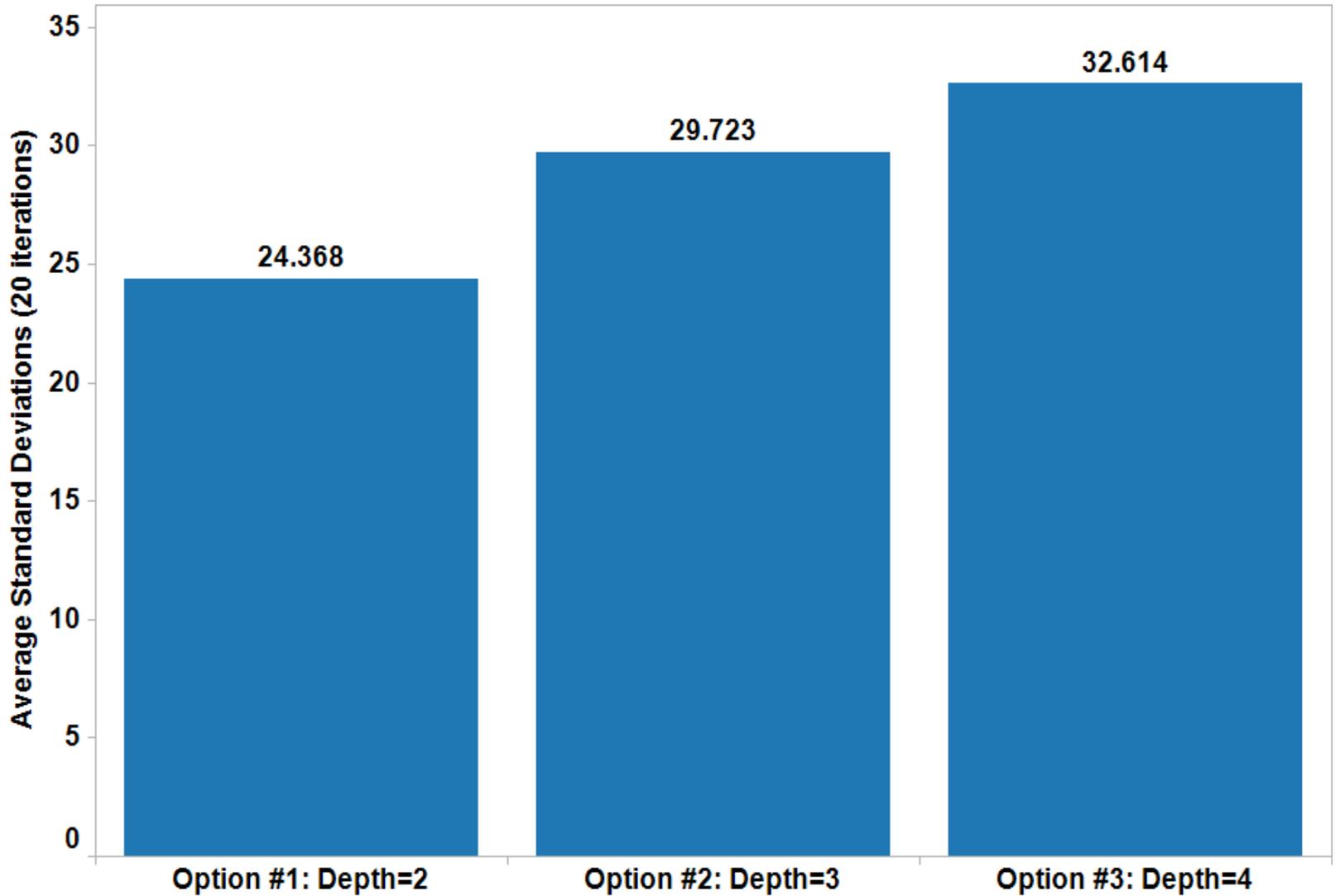
- **Topology: N-ary Tree**

Option	Degree	Depth	Spine Devices
1	4	2	16
2	4	3	64
3	4	4	256

- **Simulation Constraints**

- Flows originating at edge source device
  - (300 flows) x (# of spine devices)
- BMAC SA/DA limited to 64 unique values

# Simulation Results: Topology



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# Observations

- FNV has good scaling properties (from small to big networks)



Thank You