**Problem****Current Multicast:**◆ **IP Multicast (IPMC)**

Performs well, but is not universally available.

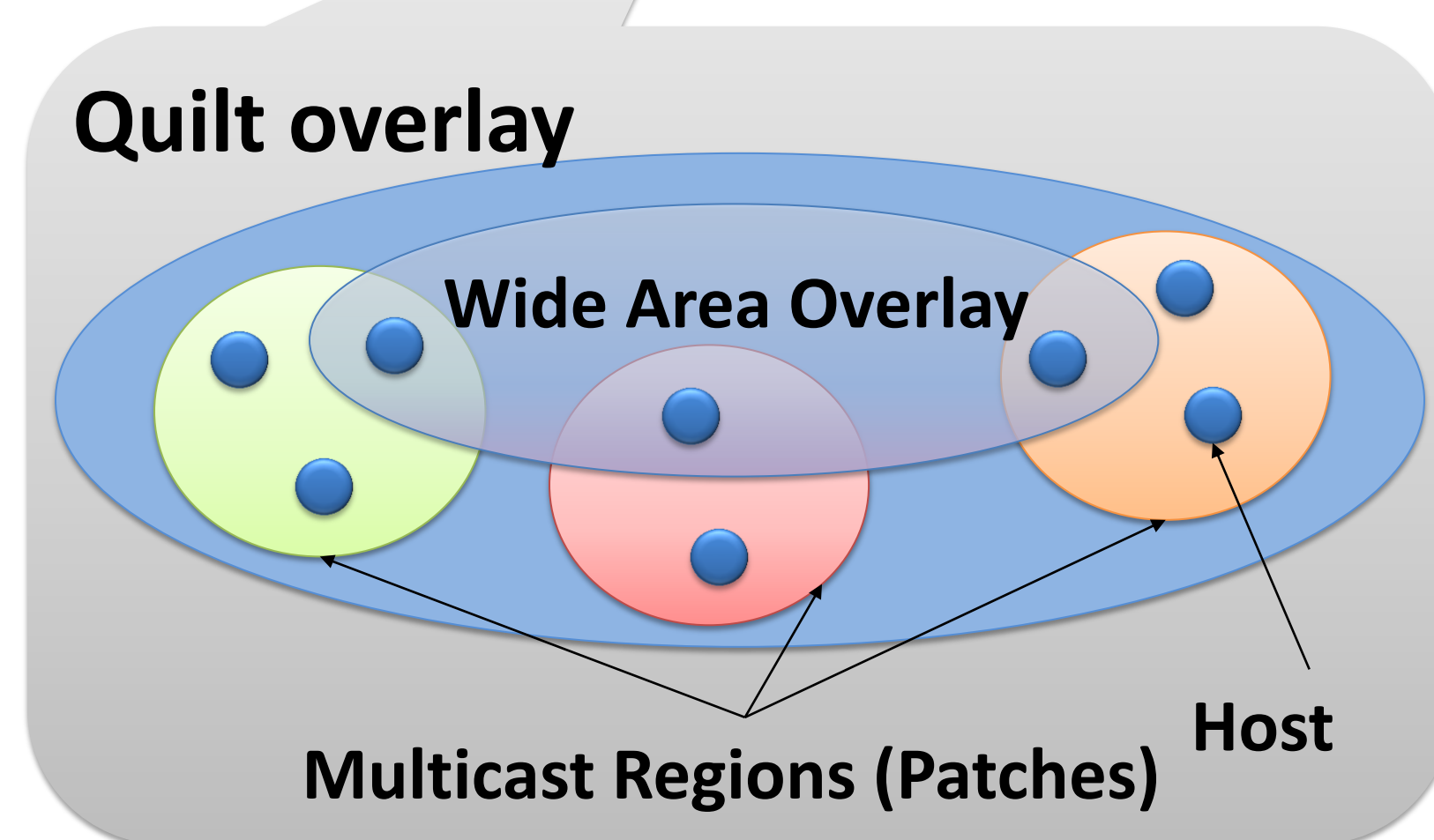
◆ **Application Layer Multicast (ALM)**

Scales to the Internet, but suffers from high latency (Mesh) or network churn (Tree).

**No single solution covers all the benefits!**

**Solution**

**Quilt:** A patchwork of Multicast Regions where each runs a different protocol; with a Wide Area Overlay sewing them together.

**Goals:**

- ◆ Minimize delivery latency
- ◆ Minimize control overhead
- ◆ Resilient to node churn/failure
- ◆ Adapt to the runtime environment

**Approach****1 Detect environment**

New host



NIC-based Environment  
Unique Identifier  
(**EUID**)

- ◆ Connectivity Options  
NAT/Firewall settings
- ◆ Local Topology  
IPMC support, topography
- ◆ Measured Performance  
Bandwidth, latency, etc.

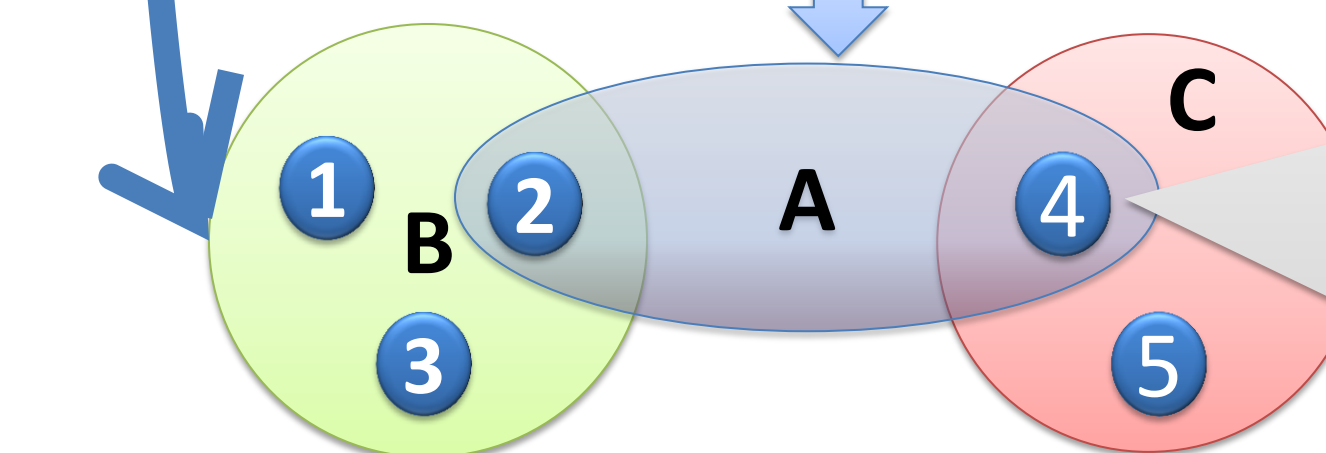
**2 Join with EUID**

Bootstrap Server

**3 Select patch for host****4 Reply with patch info**

An environment **Rule** is defined to map suitable environments, described by **EUID** values, to each multicast protocol.

Rule for Wide Area Overlay	{A: 2, 4}
Rule for Red Patch	{C: 4, 5}
Rule for Green Patch	{B: 1, 2, 3}

**5 Activate assigned multicast protocol, join the patch****Patch Representative**

- ◆ Runs multiple multicasts
- ◆ Bridges traffic among patches
- ◆ Maintained by **Bootstrap Server**



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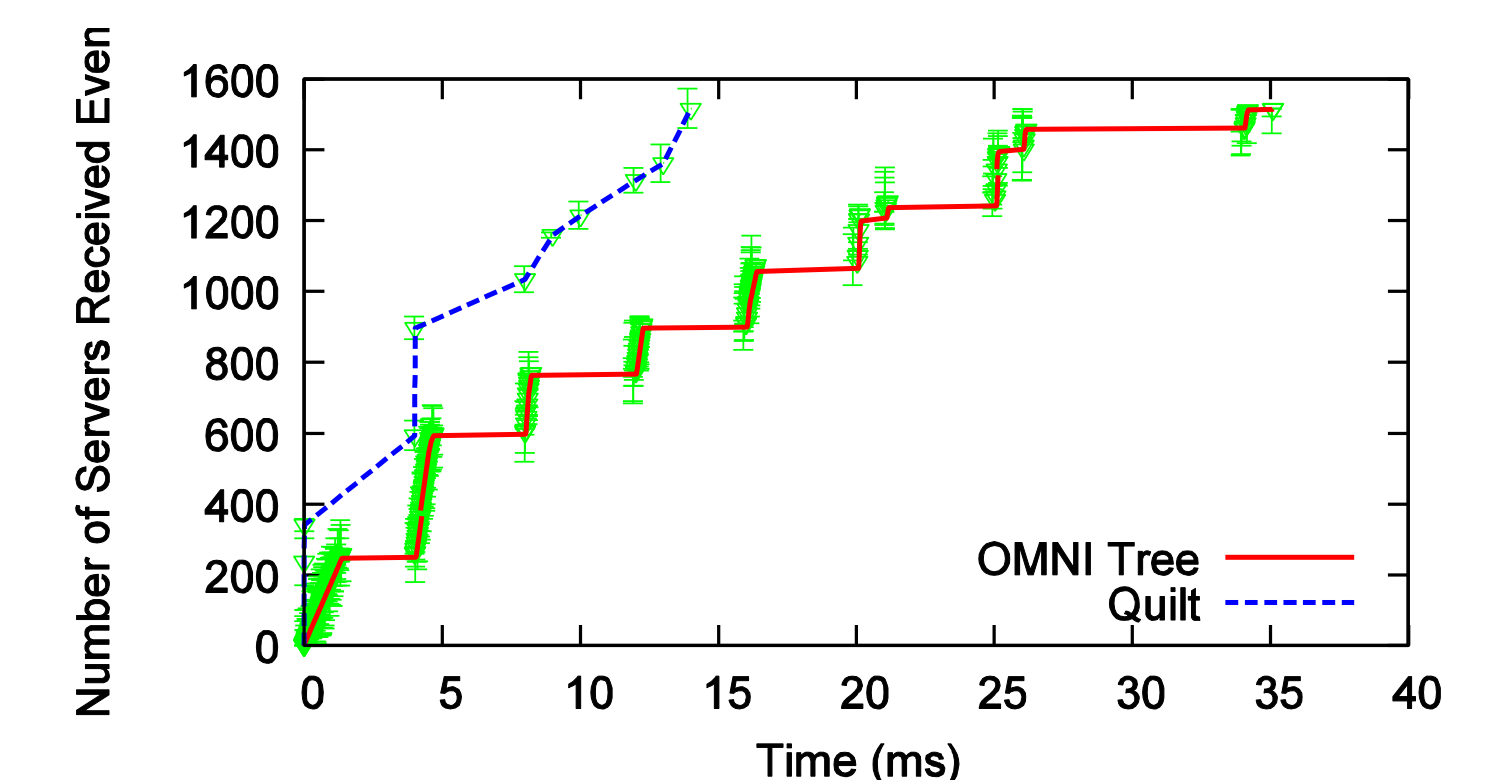
Daniel Freedman



Ken Birman

**Results****Data Center Scenario:**

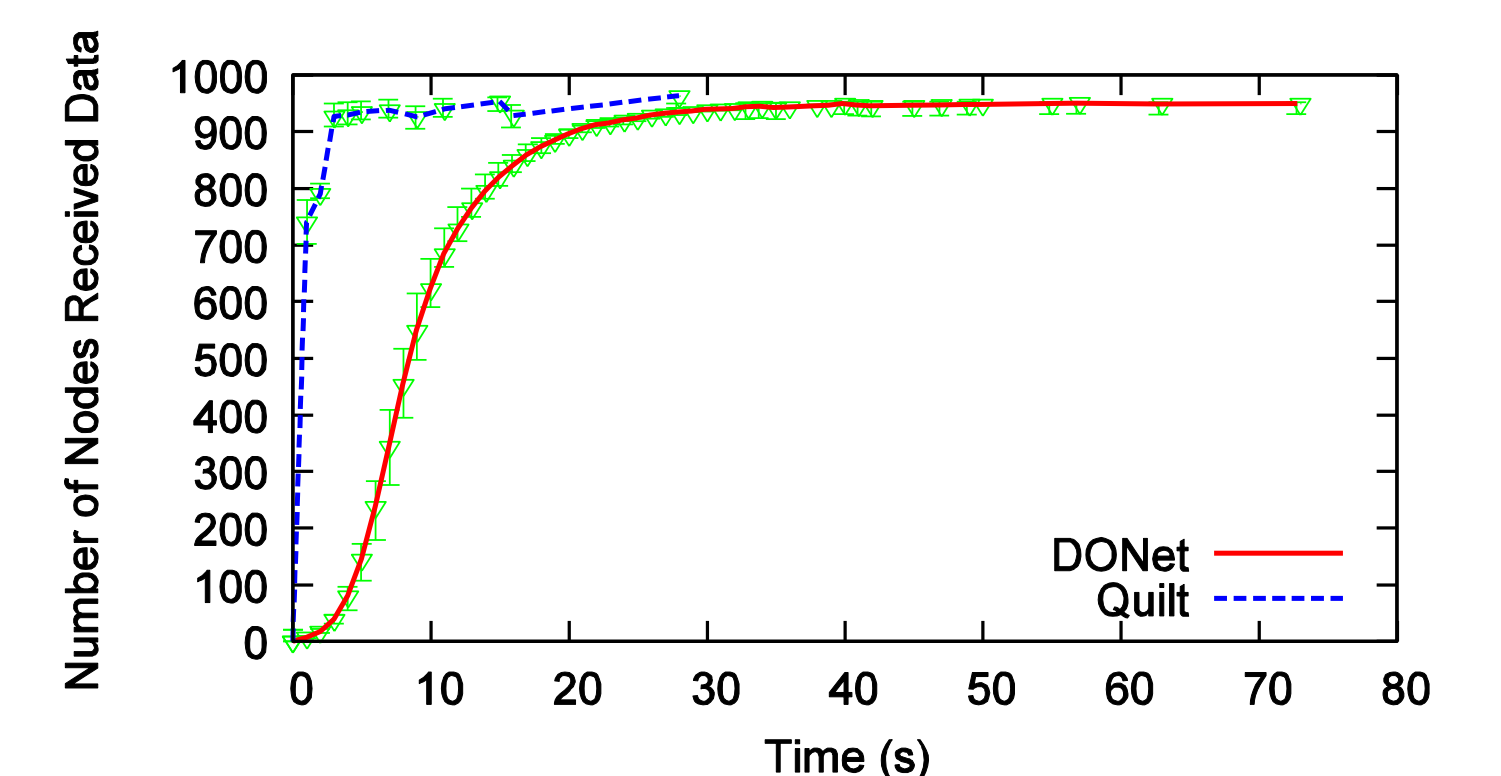
Grid5000, 25 data centers, 1531 servers in total



Quilt disseminates event messages faster than OMNI (Tree ALM) by adopting IPMC inside data centers.

**Internet Scenario:**

Peerwise, 951 nodes in total



Quilt disseminates streaming content faster than DONet (Mesh ALM) by limiting DONet only for nearby hosts, and using OMNI as Wide Area Overlay.