Quilt: An Adaptive Multicast Infrastructure for WAN Networks

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Problem

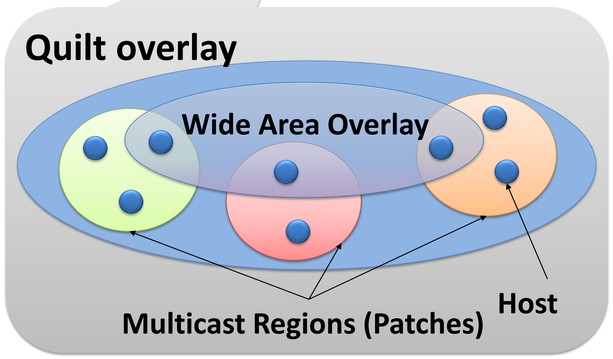
Current Multicast:

- **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

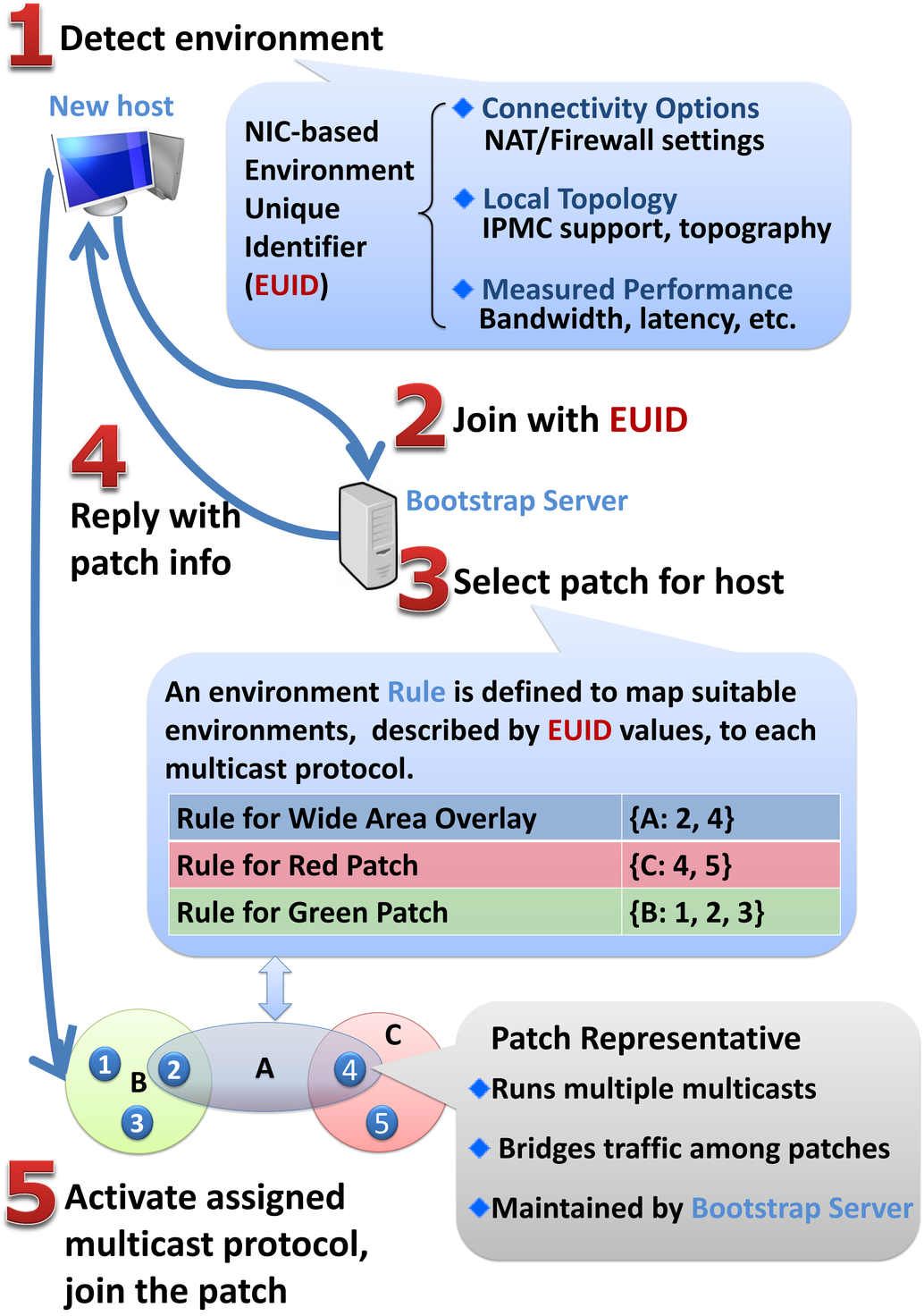
Quilt: A patchwork of Multicast Regions where each runs a different protocol; with a Wide Area Overlay sewing them together.



Goals:

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

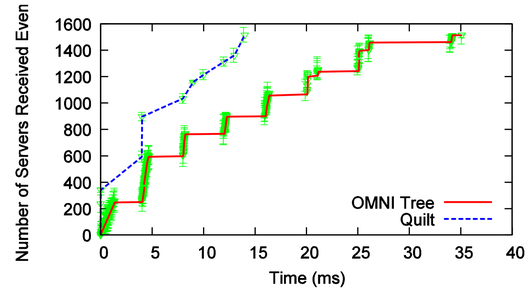
Approach



Results

Data Center Scenario:

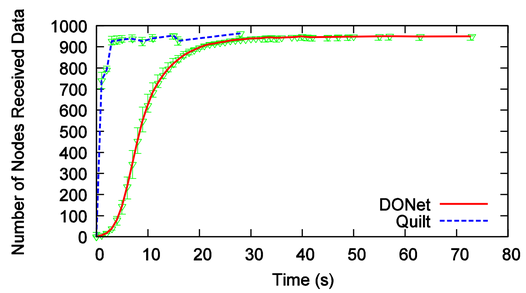
Grid5000, 25 data centers, 1531 servers in total



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.