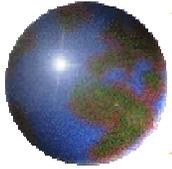


Secure Local Area Multicast *SLAM*

Clay Shields

Christopher Adam Telfer

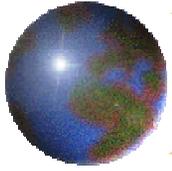
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IP Multicast

- There are 3 types of Internet traffic
- Unicast – one to one
 - a telephone call
- Broadcast – one to all
 - a PA announcement
- Multicast – many to many
 - a conference call

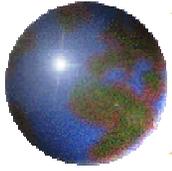
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Slow Adoption of IP Multicast

- IP multicast provides efficient multi-party communication
- Particularly useful for streaming video
- No source access control allows anyone to send
- No receiver access control allows anyone to receive

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SLAM : Secure Local Area Multicast Routing

Centralized Multicast

+

Proxy for Sender Access Control

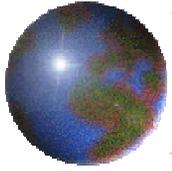
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Encryption for Receiver Access Control

=

SLAM

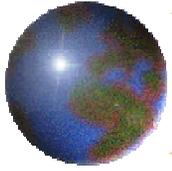
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SLAM : Sender Access Control

- All multicast traffic which is subscribed to within a domain goes to a proxy
- Proxy retransmits data to subscribed receivers via multicast
- Local multicast routing is set up by the centralized controller
- Incoming traffic may be controlled via the proxies

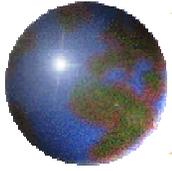
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SLAM: Centralized Multicast Routing

- 1 + web servers handle requests for multicast traffic (and billing)
- Web servers issue confirmed requests to a central controller
- Controller changes routing entries directly on routers
- Controller communication with routers is encrypted and authenticated

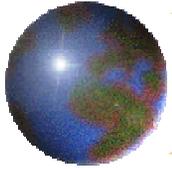
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SLAM : Receiver Access Control

- Proxies encrypt traffic to local receivers.
- Key schedule for encryption is determined in advance.
- Subscribing hosts receive a portion of the key schedule from the web server.
- Subscribers only receive keys for the duration they have paid for.

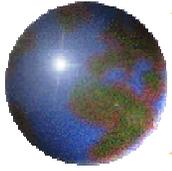
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SLAM : Implementation

- SLAM is implemented in FreeBSD
- Each FreeBSD box can act as a router
- One machine in the network should run the controller daemon
- A network may support multiple proxies

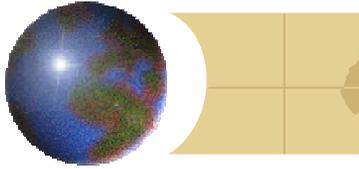
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SLAM : Future Work

- Add a GUI for management
- Create more configurable proxies
- Create web interface for control
- Use SNMPv3 for control of routers

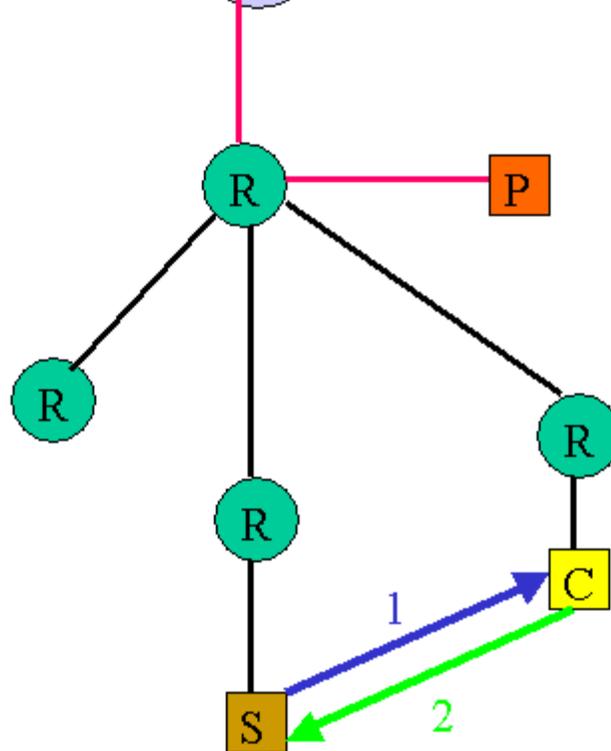
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SLAM : Subscription Phase

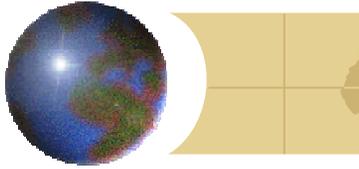


Key
1 - Subscribe
2 - Key Schedule



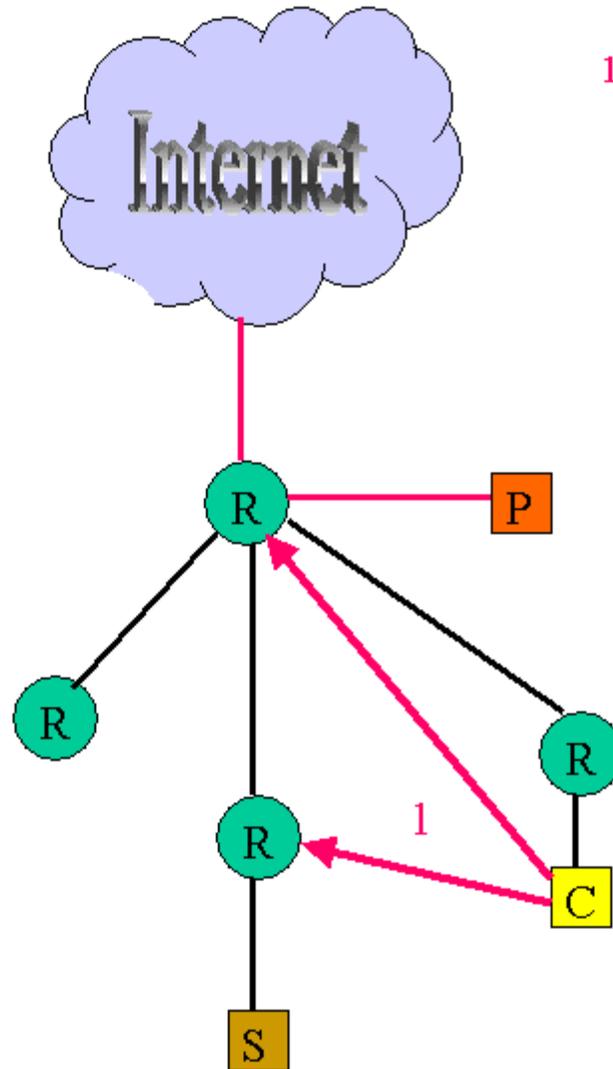
R - Router C - Controller — Active Link
P - Proxy S - Subscriber

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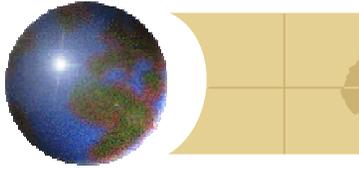
SLAM : Routing Phase

Key
1 – Multicast
Routing
Changes

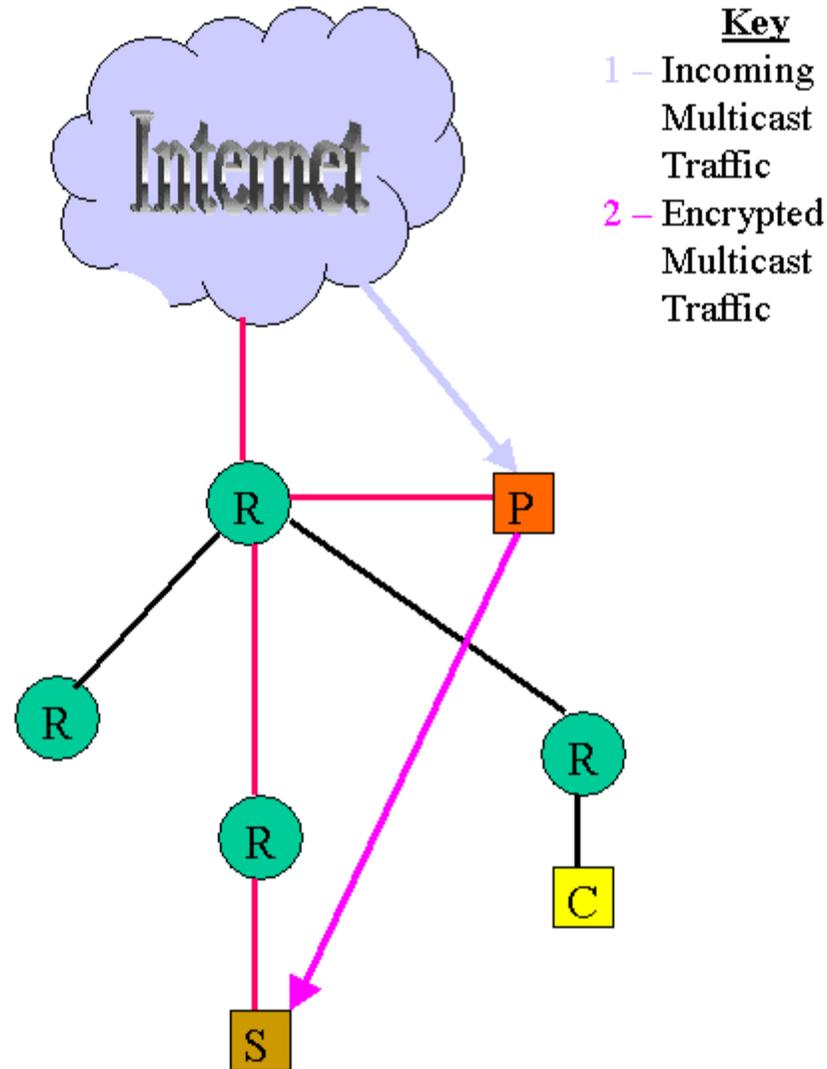


R – Router C – Controller — Active Link
P – Proxy S – Subscriber

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SLAM : Traffic Phase



Key

- 1 – Incoming Multicast Traffic
- 2 – Encrypted Multicast Traffic

R – Router C – Controller — Active Link
P – Proxy S – Subscriber

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