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Channel Reflector: Multicast Channel Announcement System

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Multicast Session Announcement

- Multicast session information consists of;
 - Source address, group address, encoding format, data rate, contents information, etc.
- Traditional method (used in MBone)
 - Session Announcement Protocol (SAP)
- Current method
 - Central server like E-mail, Regular Web

SAP

- Pros.
 - Soft-state approach
 - Easy to announce sessions
- Cons.
 - Low scalability
 - Periodically flooding SAP data over UDP/IP multicast
 - High latency (especially when a large number of senders exist)
 - No security consideration
 - Any kind of node can send and receive SAP data
 - Weak policy definition
 - Scope definition is difficult to manage
 - Cannot work in SSM-only networks

E-mail, Regular Web

- Pros.
 - Easy to use the implementations
 - Can add user authentication functions
 - But might be difficult to manage tons of thousands of users
- Cons.
 - Not suitable for highly dynamic session information announcement
 - Difficult to manage services being up and down frequently
 - Difficult to manage a very large number of sessions
 - No policy definition
 - Scope definition is conceptually impossible

Channel Reflector (CR)

- Concept
 - Web-based multicast session directory/ announcement system that consists of distributed agents
 - Easy, simple, well-managed, and functional system that facilitates further IP multicast deployment
- From end-users;
 - Regular Web server that provides available or scheduled multicast session information
- From network administrators;
 - Local server in their network

Functions

- Sender control
 - Only approved/authorized data senders and administrators can register their channel information in their local CR.
 - Only the approved CRs can synchronize their channel information to other CRs.
- Receiver control
 - Data receivers obtain available channel information from their local CR.
 - Access control is mandatory
- Scope control
 - Non-global scope channel information is announced among defined CRs (i.e. scoped CRs).

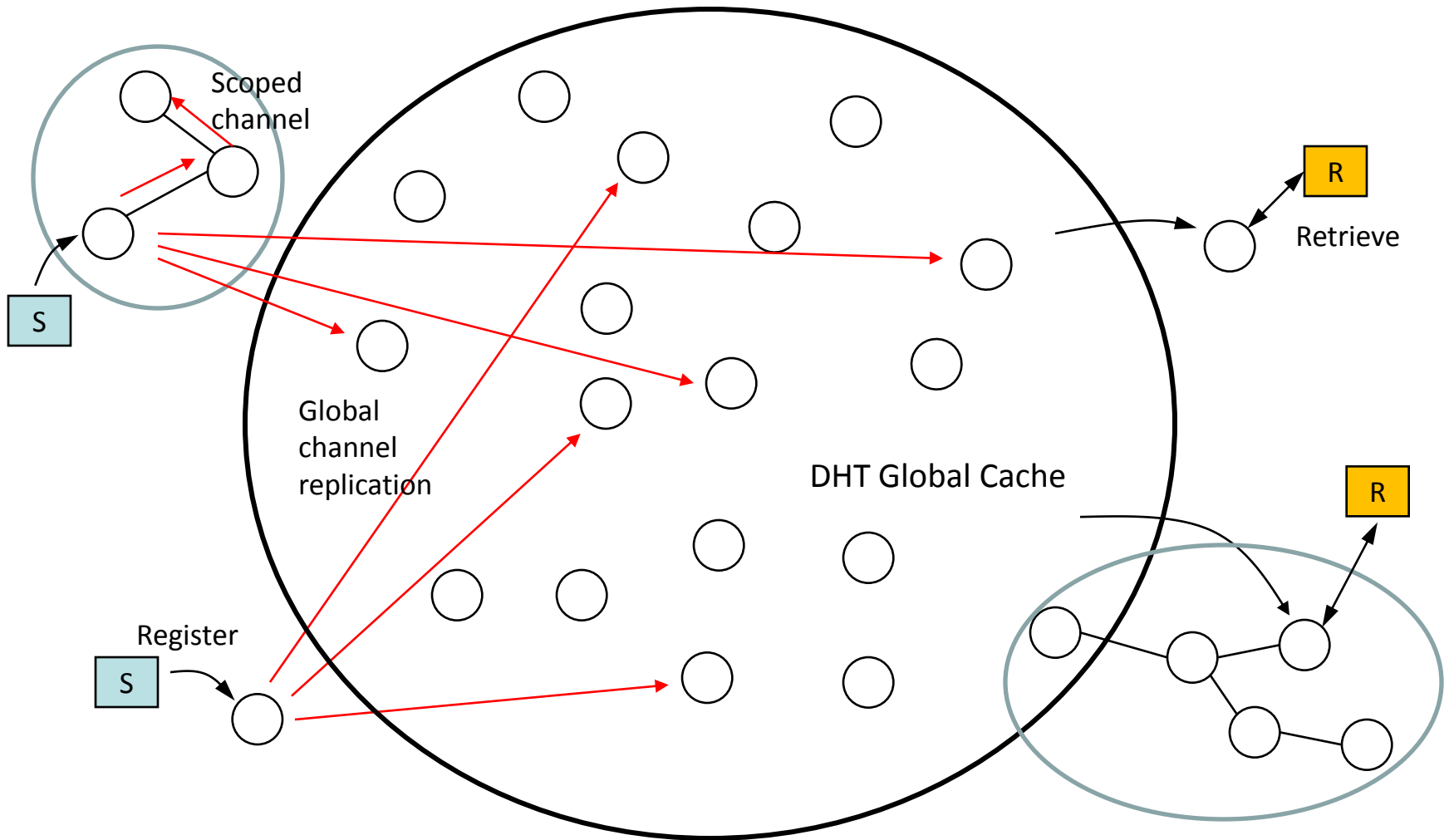
Configurations

- For global channel announcement;
 - CR global cache
- For non-global scope channel announcement;
 - CR sub-tree consists of site CRs (parent CR and child CR)
- Scope configuration (when needed)
 - Static configuration to form “scope”
- Channel information description
 - SDP – Standard session description protocol

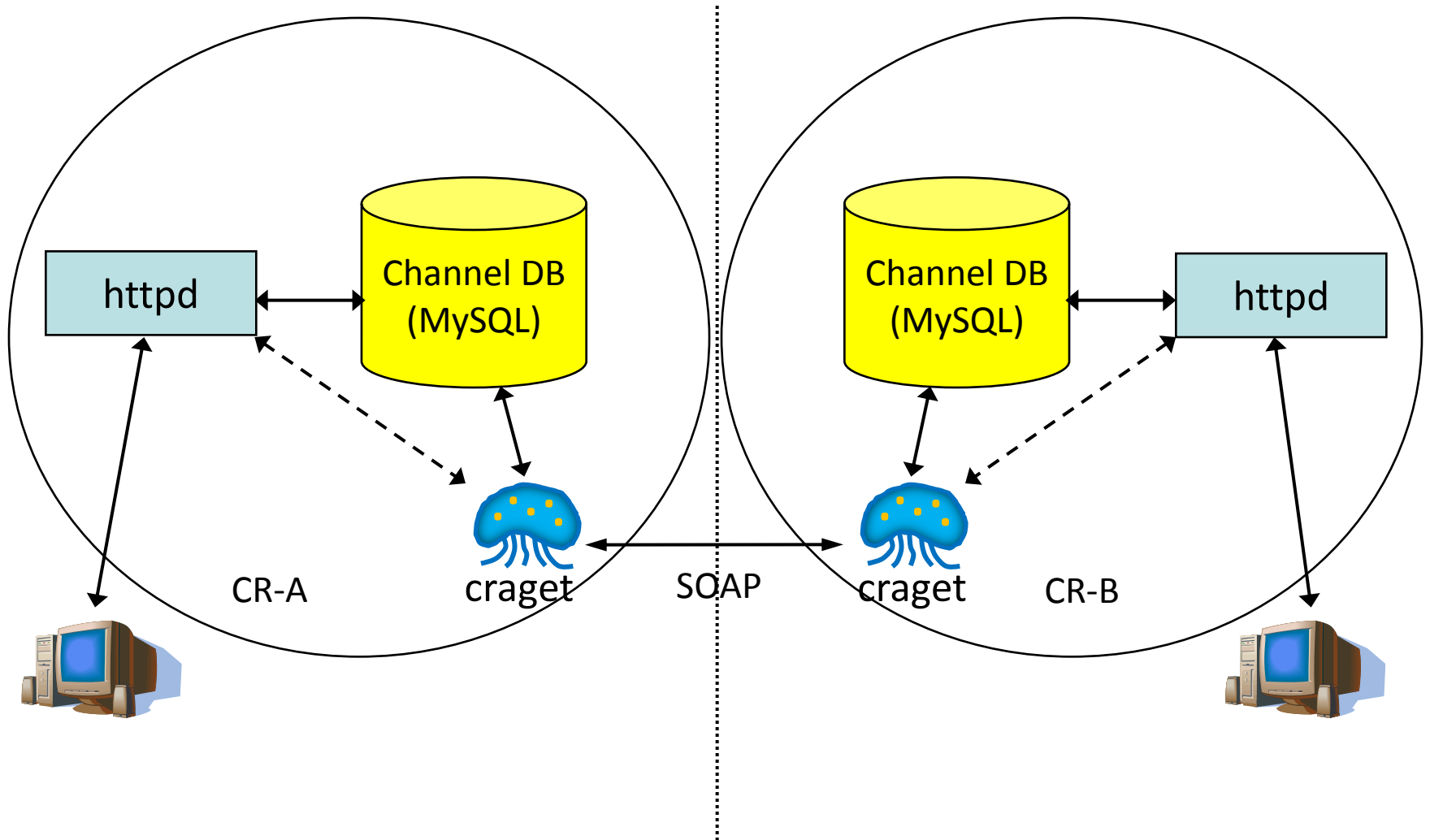
CR Implementation

- Implementation components
 - craget (Channel Reflector Agent)
 - Apache http server
 - MySQL DBMS
 - Accessed through Ajax
 - Bamboo (DHT part)

CR Global Cache and Sub-Tree



CR-to-CR Communication



Web-Based Interface

Channel Reflector Home

http://cr.example.com/

Home Browse Announcement Administration

Welcome to Channel Reflector

Login

User ID

Passwd

Search

Category

Start Time

End Time

Multicast Addr.

Sender Addr.

Pickup

Headline

- Announcement: ...
- News: ...
- News: ...


Documentation ...

Browse Channels

Channel Reflector Home

http://cr.example.com/

Home Browse Announcement Administration

← Yesterday Oct. 1 Tomorrow → Another date 

Sort by

- Category
- Date/Time
- Language
- Area

← Previous Next →

Available and scheduled channels

← Previous Next →

	10 AM	11 AM	12 AM
OSTN	[red bar]		[red bar]
NASA TV	[red bar]		
.			
.			
.			
.			



Register Channels

Channel Reflector Home

http://cr.example.com/

Home Browse Announcement Administration

[Add channel](#) [Cancel channel](#) [Export channel](#) [Import channel](#)

Multicast Addr.	<input type="text" value="232.1.2.3"/>	Address Family	<input type="text" value="IPv4"/>
Source Addr.	<input type="text" value="s1.example.com"/>	URL	<input type="text"/>
RTP Port	<input type="text" value="12345"/>	RTCP Port	<input type="text" value="12346"/>
Category	<input type="text" value="Sports/Baseball"/> ▼	Other	<input type="text"/>
Scope Label	<input type="text" value="Global"/> ▼		
Start Date	<input type="text" value="2007-10-1"/> 	Start Time	<input type="text" value="20:00"/>
End Date	<input type="text" value="2007-10-1"/> 	End Time	<input type="text" value="22:00"/>
Owner	<input type="text" value="John Doe"/>	E-mail Addr.	<input type="text" value="jd@example.co"/>
Application	<input type="text" value="dvts"/>	Max Bandwidth	<input type="text" value="30Mbps"/>

Interface for Administrators

Channel Reflector Home

http://cr.example.com/

Home Browse **Announcement** Administration

Administrator Login

User ID

Passwd

CR Configuration

[Define local](#) [Delete local](#)

[Add Parent CR](#) [Delete Parent CR](#)

[Add Child CR](#) [Delete Child CR](#)

[DHT configuration](#)

Scope Label Configuration

[Add Scope Label](#) [Delete Scope Label](#)

[Enable Scope Label](#) [Disable Scope Label](#)

Future Work

- Code improvement
- User-interface improvement
- AAA stuff
- Better scope definition

Collaboration / Cooperation

- Development
 - User interface design and its development
 - SDP/XML parser
- Operation
 - Prepare local CR
 - Make your CR be part of the global cache (DHT)
 - Bind your CR to the global cache
- User
 - Register and retrieve channel information

Release Plan

- Binary package
 - Linux rpm and NetBSD binary (planned)
 - Source code will be available after the code improvement
- If you are interested in the collaboration/cooperation, please contact me;
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