
Mechanism for Peer-to-Peer Group Management using Multiple Overlays

draft-kassinen-p2prg-group-management-00

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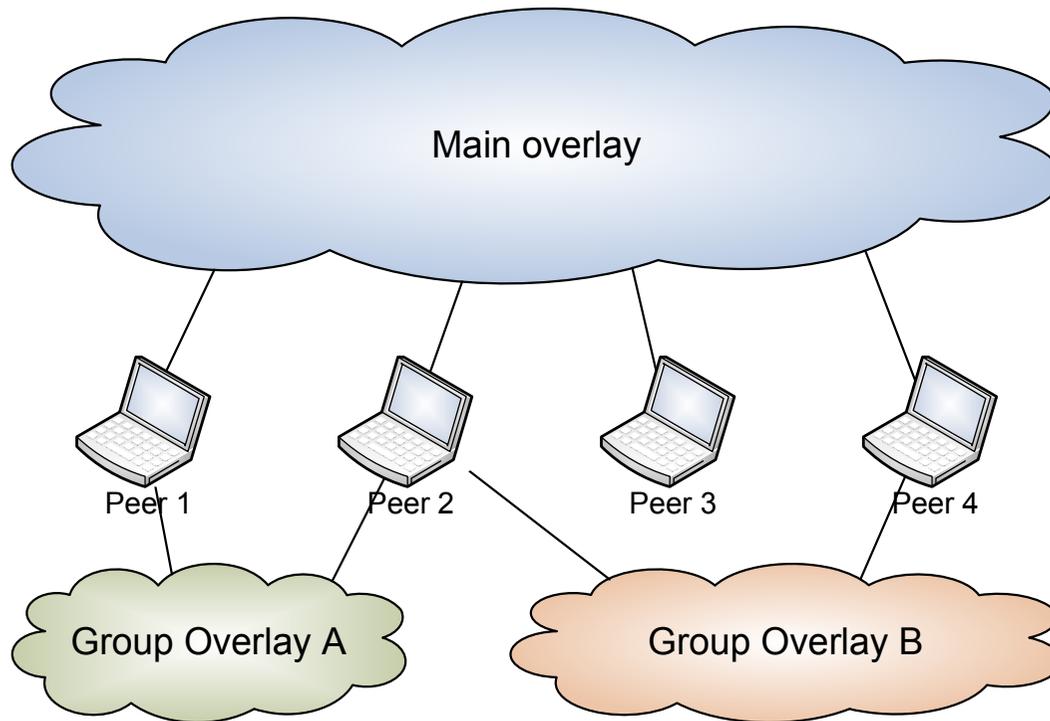
Motivation

- Major driving force for P2P: Communication and content/information sharing *within and between communities*
 - Main motivation to form groups: *to control the scope of communications for privacy reasons*
 - Trust between group members
 - The most common approach: group mgmt on the application layer
 - Not optimal when group members use multiple applications within the same group
 - *P2P-level group management needed*
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Overview

- The draft introduces *a mechanism for managing peer groups in structured peer-to-peer (P2P) overlay networks*
 - **Goal:** Efficient and secure interaction between the group members
 - **Method:** A multiple-overlay scheme
 - *Each group forms a separate overlay* with its own address space, resources, and message routing information
 - A common overlay is used for sharing information about the group overlays
 - **Advantage:** All group-specific traffic is routed inside the group overlay
 - Simplicity – no special group management protocol needed
 - Improved security and privacy
 - Routing efficiency
 - Fairer load distribution
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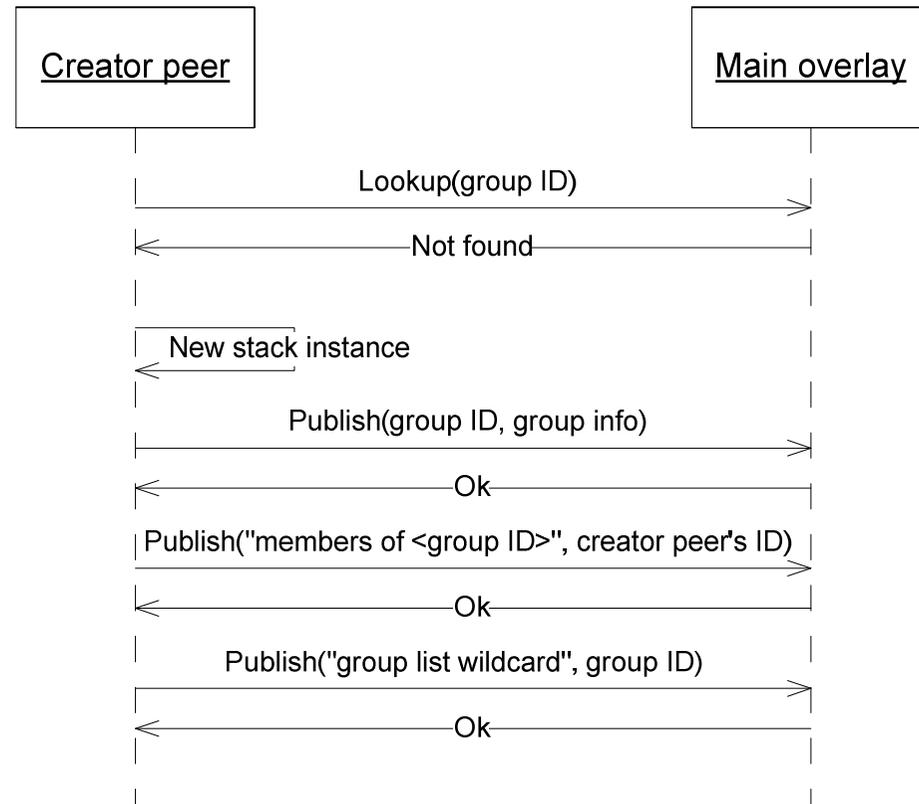
Example Scenario



- All peers are members of the main overlay
 - Peers 1 and 2 are members of group A
 - Peers 2 and 4 are members of group B
 - Peer 3 is not a member of any group
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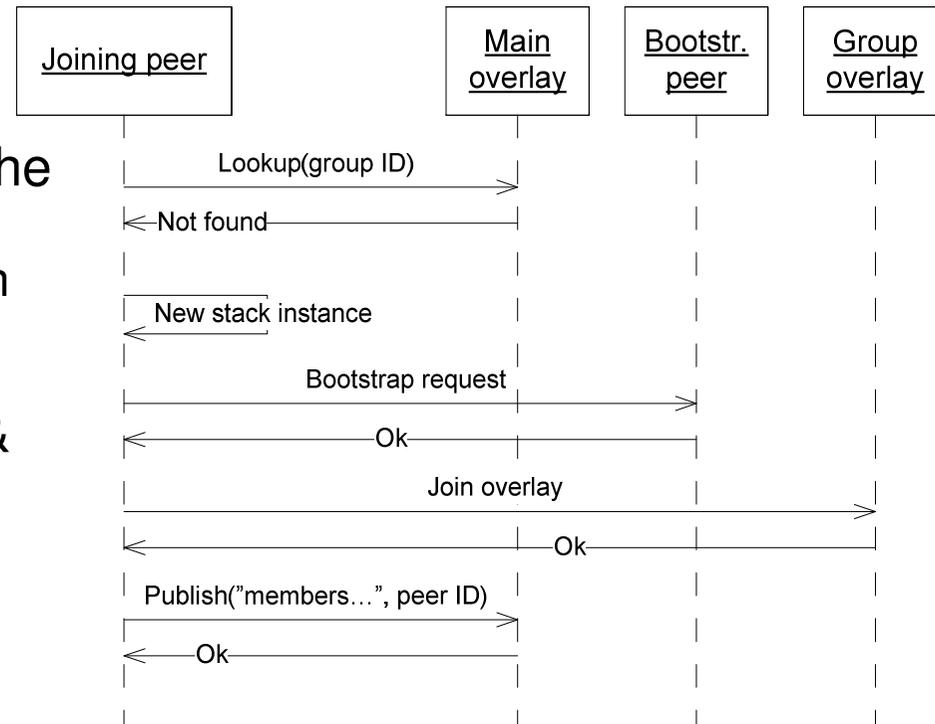
Group creation and maintenance

- Group Creation (illustrated by the figure on the right)
 - A group is created by establishing a new overlay
 - Basic case: Creator peer = bootstrap node for the group
- Group Maintenance
 - Publishing of group existence membership info in the main overlay
 - Normal overlay maintenance messaging in group overlay
 - One of the group peers responsible for advertisements



Joining and leaving

- Joining (figure)
 - Joining node finds the group by looking it up in the main overlay
 - Private group information distributed using other methods
 - Details of bootstrapping & joining depends on the protocol used in group overlay
- Leaving
 - Simply by leaving the group overlay



Group removal and binding to alias

- Group removal
 - Group overlay ceases to exist when no nodes remain there anymore
 - Last peer should remove group and membership information from the main overlay
 - If not, the group and membership information remains in the main overlay until their expiration
 - Binding to "Alias" ID
 - Makes possible to establish aliases for existing groups
 - Useful in some scenarios
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Data format

- XML-based documents
 - Preceded by the header "GROUP-MANAGEMENT:"
 - Enables distinguishing group management resources from other types without XML-parsing
- Example of a published group info document:

```
GROUP-MANAGEMENT:  
<group_management type="group-info">  
  <bootstrap-address>12.34.56.78</bootstrap-address>  
  <bootstrap-port>5080</bootstrap-port>  
  <description>The most jolly group!</description>  
</group_management>
```

- Detailed XML schema TBD.
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Open issues

- ❑ First version of the draft => Many open issues
 - E.g. Bootstrapping
 - ❑ How to ensure that only legitimate members are able to join a particular group?
 - Future work: mechanism for secure group access management
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Discussion

- Questions/comments about the proposed model?
 - Anybody interested in contributing to the draft?
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