A Unified Proposal for Bulk AOR Dynamic Routing

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Problems with Proposed/Deployed Models

- REGISTER semantics inherently deal with a single user.
- Extending REGISTER to work with multiple users is a change to the existing authorization model for a core SIP request method. This may break assumptions of deployed servers.

Problems, continued

- By reversing model of who indicates the AORs being registered (i.e., delegating determination of registered AORs to the registrar using implicit registration), artificial mismatches between SSP behavior and PBX expectations can arise.
  - No good solution: by the time the PBX knows something is wrong, the incorrect network state is already created.
  - When the PBX detects the error, there is no protocol recovery path.
  - If we return to the model in which the client explicitly indicates the AORs under consideration, and the server indicates whether the requested AORs are in policy, then this artificial problem dissolves.

Many Documented “Problems” are Issues with Solution

- Many of the documented “problems” are not inherent to the issue of bulk registrations, and arise only from stretching REGISTER in directions it was never intended. These problems simply dissolve when addressed using other mechanisms:
  - The need for explicit indicators
  - PAU mismatch issues
  - Register response sizes
  - Target information loss
  - “Loose routing” issues

“Backwards Compatibility” is a Fallacy

- Objections to using approaches other than a “tweaked REGISTER” generally reduce to “but we currently have REGISTER deployed.”
- Currently deployed solutions suffer from myriad problems; cf. mixing-problems document.
- Therefore, protocol changes are required.
- If protocol changes are required, then all currently deployed solutions require updating.

Overview of Proposal

- Information in SIP Location Server db is available through two mechanisms:
  - REGISTER can both set and get information for a single user
  - SUBSCRIBE/NOTIFY with ‘reg’ event package can get information for multiple users
- Natural extension of the foregoing: PUBLISH with ‘reg’ event package can set information for multiple users

Behavior

- Publisher (e.g., SIP PBX) publishes and maintains routes using ‘reg’ event PUBLISH requests. To conserve space, we define a new body type for ‘reg’ event that can aggregate several AORs into a single record.
- Dynamic Routing Server updates Location Server db with information from PUBLISH requests.

Example: Routing E.164 Range

PUBLISH sip:company@routing-server.example.com SIP/2.0
Via: SIP/2.0/UDP server19.example.com;branch=z9hG4bKnasaii
From: sip:pbx.example.com;tag=xyzygg
To: sip:company@routing-server.example.com
Call-ID: 9987@app.example.com
CSeq: 1288 PUBLISH
Max-Forwards: 70
Expires: 3600
Event: reg
Content-Type: application/reginfo-bulk
Content-Length: ...

1 full
/sip:+1214329(0...)@example.com/sip:\1@pbx.example.net/ 14 registered

Example: Routing Domain

PUBLISH sip:company@routing-server.example.com SIP/2.0
Via: SIP/2.0/UDP server19.example.com;branch=z9hG4bKnasaii
From: sip:pbx.example.com;tag=xyzygg
To: sip:company@routing-server.example.com
Call-ID: 9987@app.example.com
CSeq: 1288 PUBLISH
Max-Forwards: 70
Expires: 3600
Event: reg
Content-Type: application/reginfo-bulk
Content-Length: ...

1 full
/sip:(.*)@example.net/sip:\1@192.0.2.5/ 14 registered

Example: Routing Multiple Ranges

PUBLISH sip:company@routing-server.example.com SIP/2.0
Via: SIP/2.0/UDP server19.example.com;branch=z9hG4bKnasaii
From: sip:pbx.example.com;tag=xyzygg
To: sip:company@routing-server.example.com
Call-ID: 9987@app.example.com
CSeq: 1288 PUBLISH
Max-Forwards: 70
Expires: 3600
Event: reg
Content-Type: application/reginfo-bulk
Content-Length: ...

1 full
/sip:+1214329(0...)@example.com/sip:\1@pbx.example.net/ 14 registered
/sip:+1919555([123456789]...)@example.com/sip:\1@pbx.example.net/ 14 registered

Advantages

- By mimicking REGISTER on an AOR-by-AOR basis, many of the problems that arise from implicit registration with multiple users are completely sidestepped.
  - "Loose routing" and "target URI" problems disappear – request processing is identical to singly-registered AORs.
  - Ambiguities that cause authorization policy and "P-Asserted-Identity" mismatches are far clearer with this model.

Advantages, cont.

- Because REGISTER is not overloaded to mean two different things, no explicit indicator is required.
- Because the UAC specifies the AORs to be routed, no opportunity for (e.g. P-Associated-URI) mismatches arise.
- Also because the UAC specifies the AORs, response size is not an issue.
- Compact representation of AORs to be routed helps manage total message sizes.