Call Processing Languages for Internet Telephony

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Motivation

- IP Telephony moves intelligence to end systems — we need to have some way of putting it there!

- But end systems aren’t always turned on, so we need some standardized way to tell proxies what to do
Location

- Script execution either in an end-system or a proxy
  - This has implications for what functionality is available in each case
- Sent to server as part of location-registration
  - A registration is a trivial CPL script
- Hierarchy of execution
  - Successive proxies can execute successive CPLs (inbound or outbound)
  - This model can be generalized to allow multiple CPLs in the same proxy (administrative vs. user control)
Design principles

- Simple
  - Safe implementations (vs. security leaks, DoS)
  - Automatic verification of correctness
  - Ease of implementation
  - Inspiration: Sieve
    - No functions
    - No looping

- System-independent
  - The same script (e.g. for behavior on busy) should work in a proxy or end system, to the extent possible

- Protocol-independent
  - At least including SIP and H.323 — CPL is high-level
Features

Three categories of necessary features:

• Events
• Queries
• Actions
Events

- Basic invitations
- Other invitation-like requests
- Departure
- Call responses and timeouts
- In-call changes
- Third-party call control
- “In-band” signaling
Queries

<table>
<thead>
<tr>
<th>Call state</th>
<th>busy, n calls queued</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheduling</td>
<td>time of day, user’s calendar</td>
</tr>
<tr>
<td>Location information</td>
<td>find the end system</td>
</tr>
<tr>
<td>Database lookup</td>
<td>anything...</td>
</tr>
</tbody>
</table>
Actions

User notification  alert dialog, ringing
User confirmation  especially for potentially dangerous actions
Call proxying      including multiple parallel proxying (search)
Call rejection     including redirection
Logging           of arbitrary data?
External CPL scripts at remote locations?