

A photograph of the Clifton Suspension Bridge in Bristol, England, spanning a deep gorge over the Clifton Suspension Railway. The bridge is a suspension bridge with two large stone towers. The background shows a river valley with green hills and buildings.

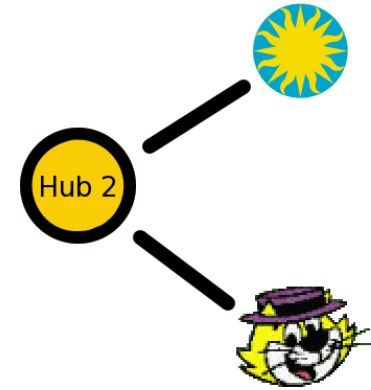
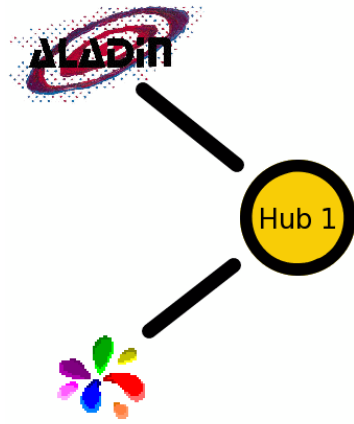
SAMP Bridge

Mark Taylor
(AstroGrid, Bristol)

IVOA Interop Meeting,
ESO
9 November 2009

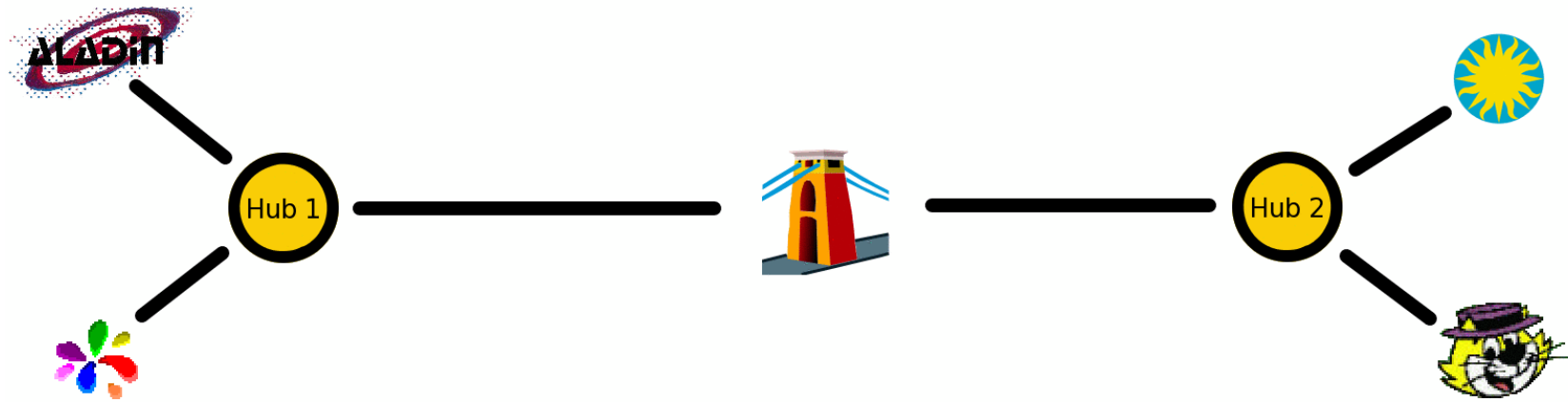
`$Id: bridge.tex,v 1.5 2009/11/02 14:12:09 mbt Exp $`

Operation



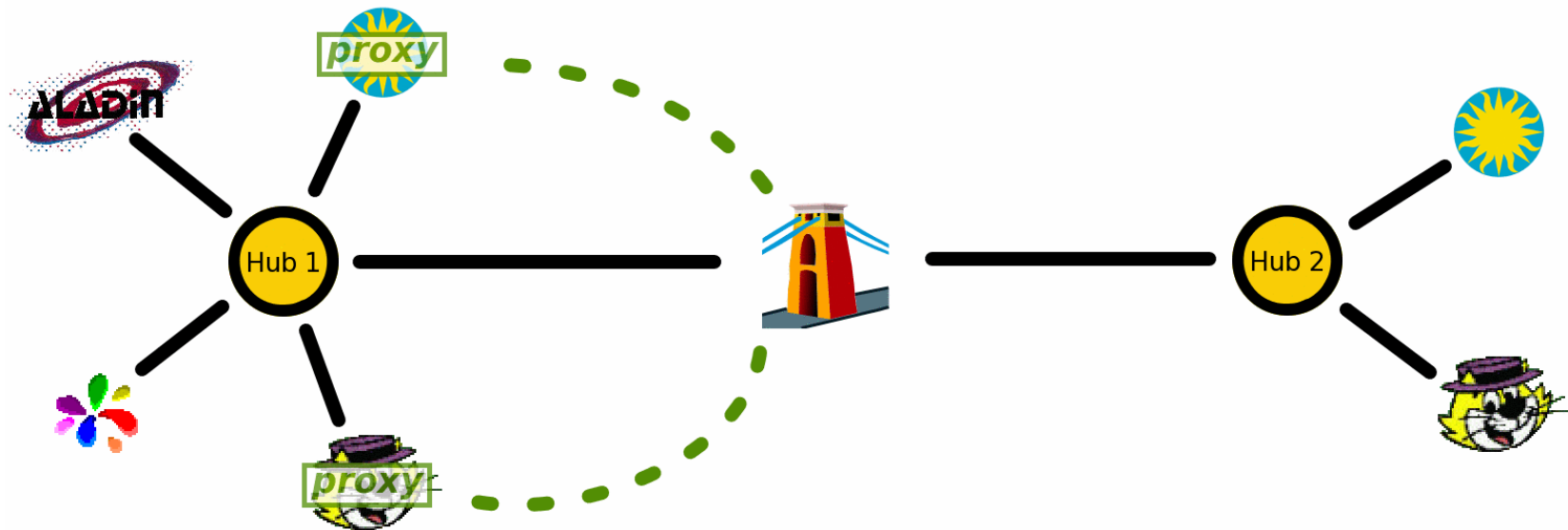
1. Two independent hubs are running

Operation



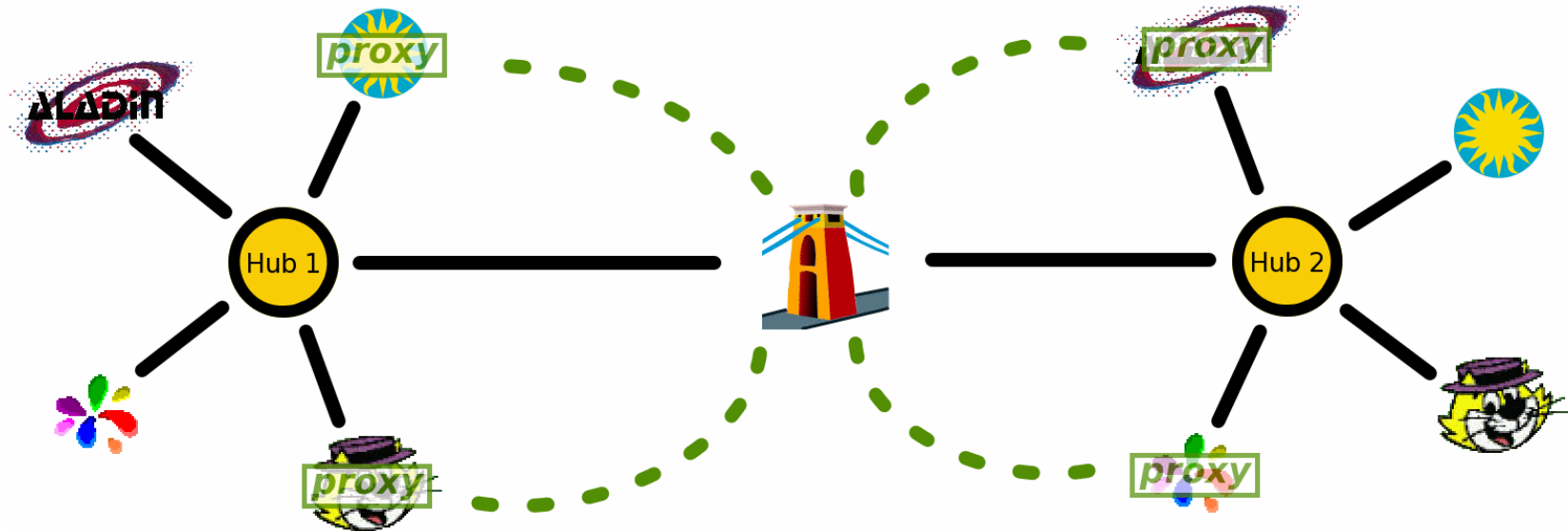
1. Two independent hubs are running
2. Bridge starts up, connects to both hubs

Operation



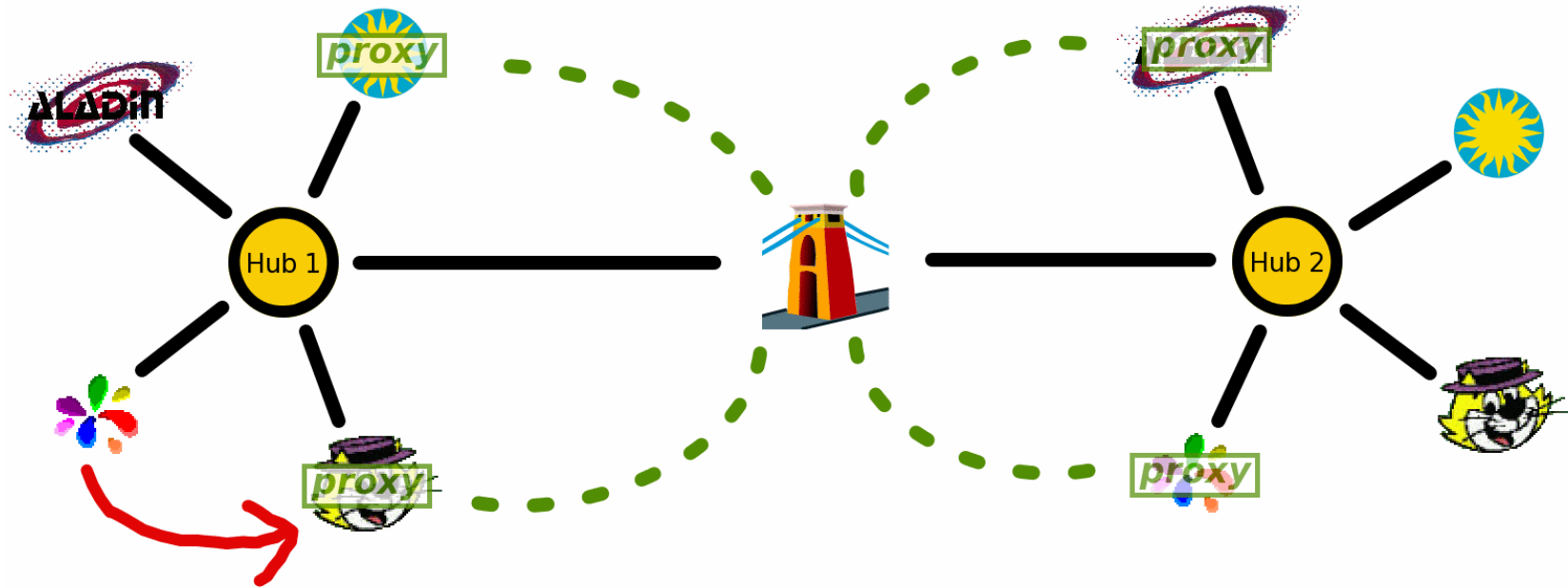
1. Two independent hubs are running
2. Bridge starts up, connects to both hubs
3. Proxies for Hub 2 clients, controlled by Bridge, connect to Hub 1

Operation



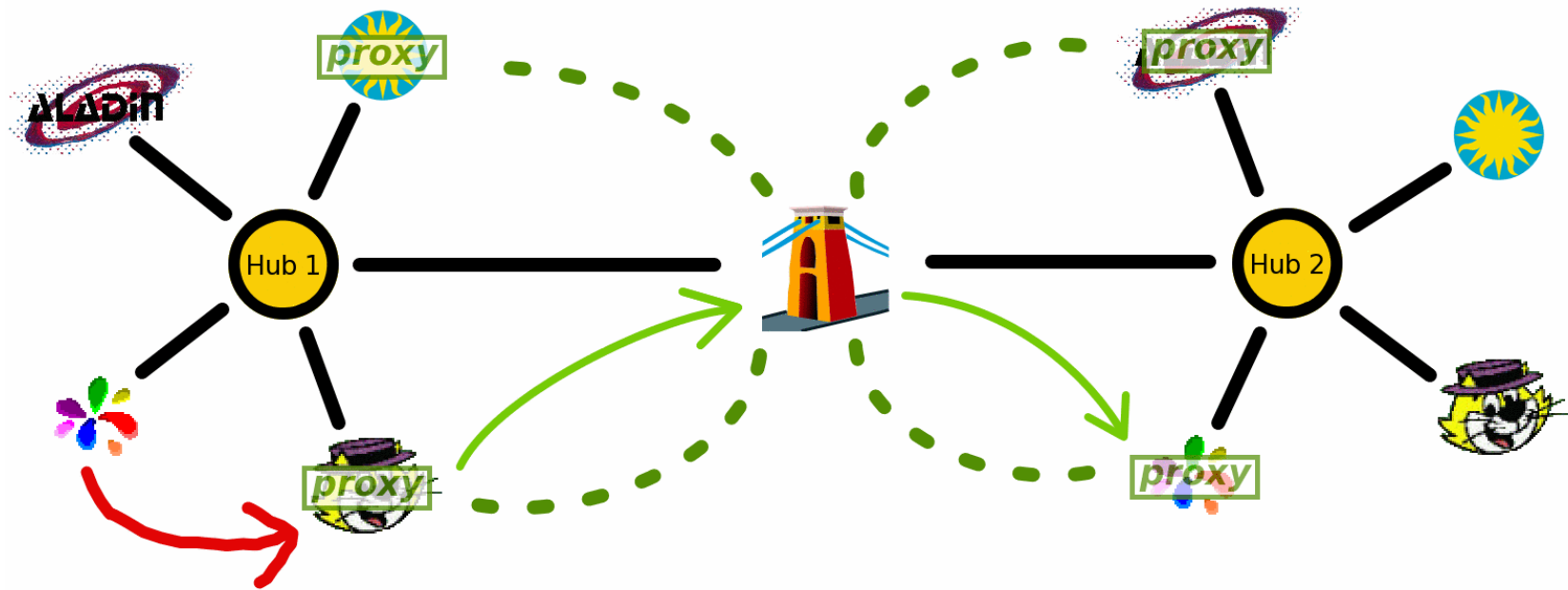
1. Two independent hubs are running
2. Bridge starts up, connects to both hubs
3. Proxies for Hub 2 clients, controlled by Bridge, connect to Hub 1
4. Proxies for Hub 1 clients, controlled by Bridge, connect to Hub 2

Operation



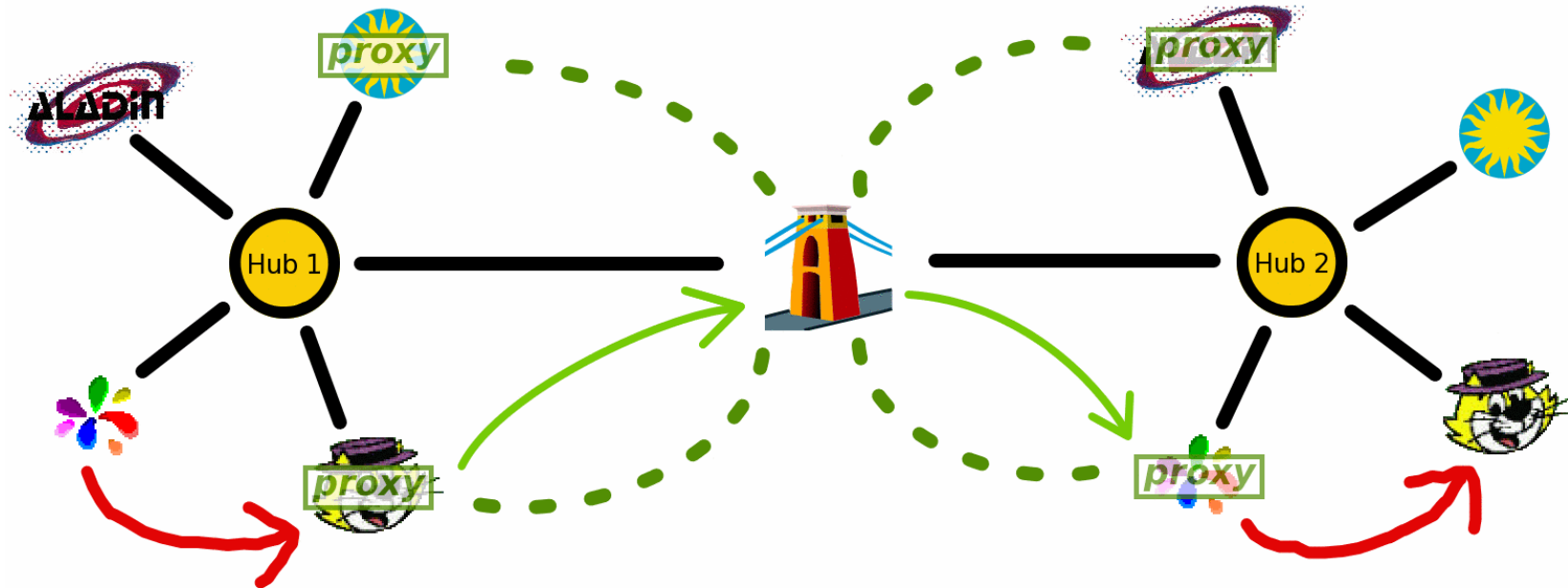
1. Two independent hubs are running
2. Bridge starts up, connects to both hubs
3. Proxies for Hub 2 clients, controlled by Bridge, connect to Hub 1
4. Proxies for Hub 1 clients, controlled by Bridge, connect to Hub 2
5. Local client sends message to proxy client on Hub 1

Operation



1. Two independent hubs are running
2. Bridge starts up, connects to both hubs
3. Proxies for Hub 2 clients, controlled by Bridge, connect to Hub 1
4. Proxies for Hub 1 clients, controlled by Bridge, connect to Hub 2
5. Local client sends message to proxy client on Hub 1
6. Bridge tunnels this action to an equivalent operation on Hub 2 (possibly translating URLs)

Operation



1. Two independent hubs are running
2. Bridge starts up, connects to both hubs
3. Proxies for Hub 2 clients, controlled by Bridge, connect to Hub 1
4. Proxies for Hub 1 clients, controlled by Bridge, connect to Hub 2
5. Local client sends message to proxy client on Hub 1
6. Bridge tunnels this action to an equivalent operation on Hub 2 (possibly translating URLs)
7. Proxy client sends message to local client on Hub 2

Features

Architectural features:

- Uses only standard SAMP client interface
 - ▷ no privileged/non-standard hub access required
 - ▷ works with any hub implementation
 - ▷ could use different profiles for different bridged hubs
- Any number of hubs can be connected
 - ▷ Each local client has a proxy on every other hub
 - ▷ Currently can't add hubs dynamically to running bridge

Additional functionality:

- URL translation
- Metadata mangling

URL Translation

There is a problem with host-specific URLs

- Many MTypes use URLs to point to data

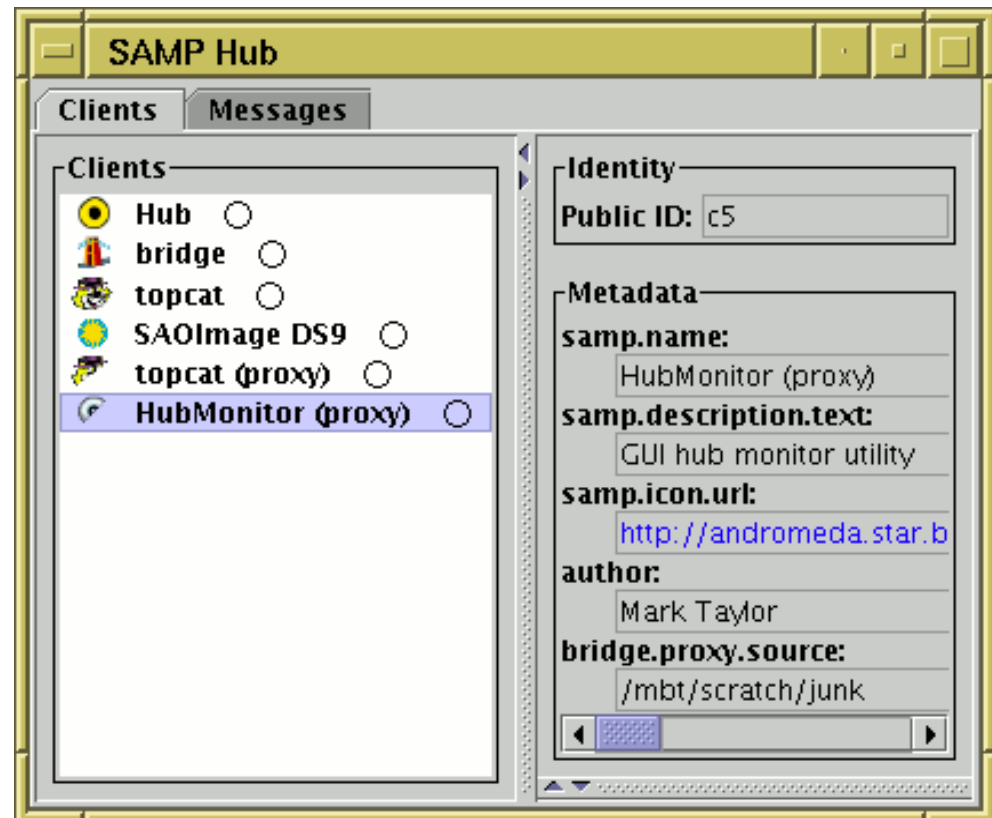
```
samp.mtype: "table.load.votable"  
samp.params: {  
  url: "file:///data/foo/bar.vot"  
  name: "Galaxies" }
```

- URL may make sense to sender, but not to recipient on a different host
- Two URL types cause problems:
 - ▷ `http:` URLs with “localhost”, “127.0.0.1”, or insufficiently-qualified hostnames
 - ▷ `file:` URLs
- Bridge tries to translate to remotely-understandable forms:
 - ▷ Identifies message params that look like URLs (*potentially problematic; usually OK*)
 - ▷ `http:` URLs:
 - ☺ maps “localhost” or “127.0.0.1” → fully-qualified domain name
 - ▷ `file:` URLs on bridge-local host:
 - ☺ maps to new dynamic `http:` URL in bridge’s internal HTTP server
 - ▷ `file:` URLs on remote host:
 - ☹ no action possible (*remote translator service?? security issues*)

Metadata Mangling

Convenient to tweak proxy client metadata for recognition

- `samp.name`: “ (proxy)” appended
- `samp.icon.url`: icon adjusted to half-visible
- `bridge.proxy.source`: new key indicating native hub



Set Up

bridge is part of JSAMP

Need to tell Bridge which hubs to connect to

- Use command-line flags; two or more of:
 - ▷ `-standard`: Standard Profile with standard lockfile `~/.samp` (*default*)
 - ▷ `-sampdir <dir>`: `.samp` lockfile in non-standard location
 - ▷ `-sampfile <filename>`: lockfile with non-standard name/location
 - ▷ `-keys <xmlrpc-url> <secret>`: give hub endpoint and password explicitly
 - ▷ `-profile <classname>`: custom SAMP profile implementation

- Example:

```
java -jar jsamp.jar bridge -standard \  
                                -keys http://foo.bar.org:54321/xmlrpc 3269ea83
```

- Programmatically, supply array of `ClientProfile` objects:

```
public Bridge( ClientProfile[] profiles ) { ... }  
  
public interface ClientProfile {  
    HubConnection register() throws SampException;  
}
```

No other configuration necessary

- Can optionally configure non-default URL translation

Uses

Why bridge?

- Collaboration
- Join domains using different profiles
- . . . more?

Benefits over single-hub collaboration

- URL translation (better, though not perfect, inter-host data transmission)
- Metadata mangling (easier to distinguish local from remote clients)
- Does not disrupt single-hub operation for either user
- Spreads load (communications local to one hub don't involve other hub(s))
- May use different profiles on each hub

Issues

Possible problems for use:

- Firewalls
- Remote host-specific (`file:///...`) URLs
- Performance
 - ▷ Lots of hubs?
 - ▷ Slow/WAN connection?

Future Enhancements

Possible improvements, if there is demand:

- Easier set up (GUI)
- Dynamically add/remove hubs
- Better visual indication of which clients are proxies, and where they are proxied from