The openais project

Technomap

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Agenda

- **2004 Accomplishments**
- **Current & Future Technology**
- **Technomap**
- **CGL Cluster Spec Analysis**

2004 Accomplishments

Project open sourced
Included AMF, CLM, CKPT
Using virtual synchrony

Pthreads library support

EVT service merged
By Mark Haverkamp

AMF Configuratoin
Support merged by
Sakai Miyotaka

EVS service merged

OSDL and SA Forum
Announce official support

First project users

3rd generation protocol
Implemented and merged

July **August** **September** **October** **November** **December** **January**

Current Technology - Single Ring Protocol

TOKEN P1

P2

P5

P3

P4
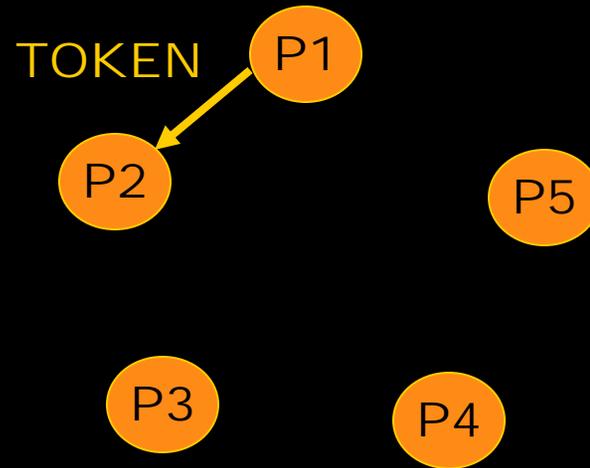
# Current Technology - Single Ring Protocol
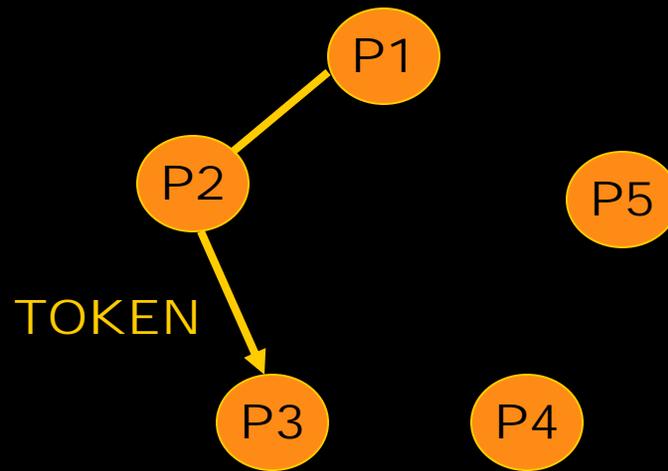
Current Technology - Single Ring Protocol
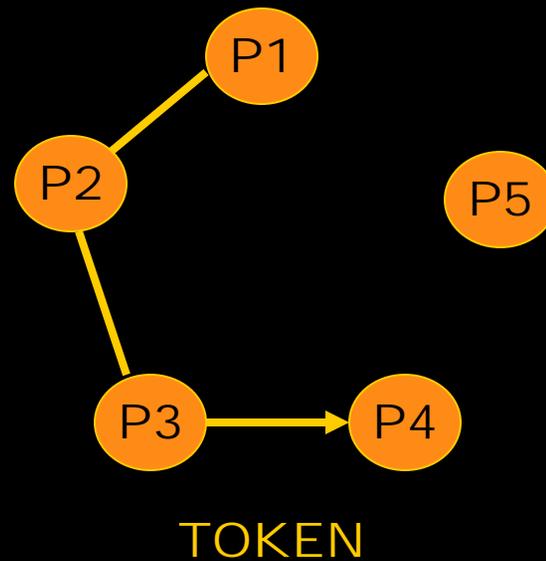

TOKEN

Single Ring Protocol – Problems

- **Latency from origination to agreed deliver is ½ token rotation time**
- **Bandwidth per processor is total/processor count when all processors transmit maximum**

Future Technology - Multi Ring Protocol

Current Technology - IPC System
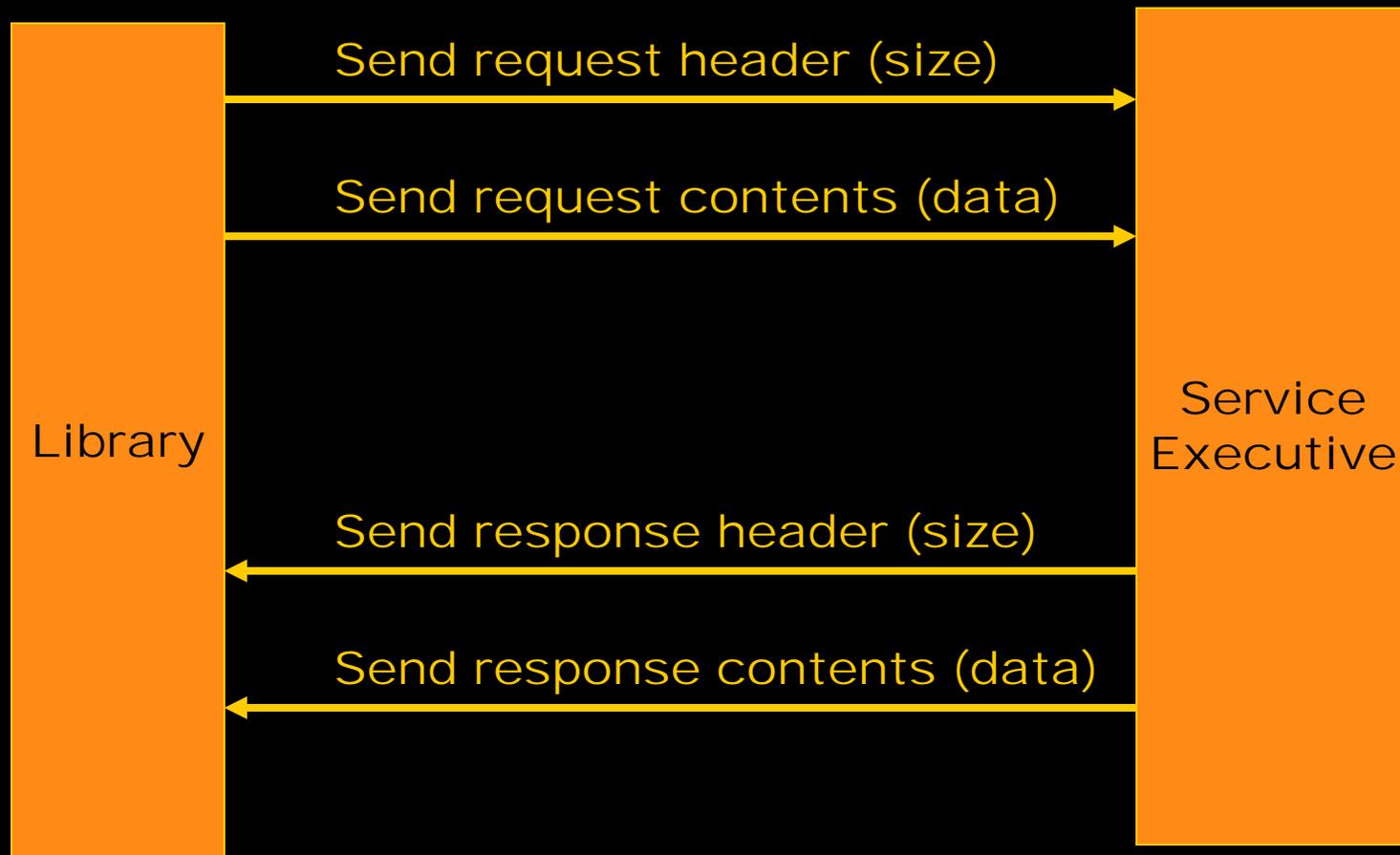
Future Technology – SOCK_SEQPACKET

Library

Service Executive

Send request (data)

Send response data)
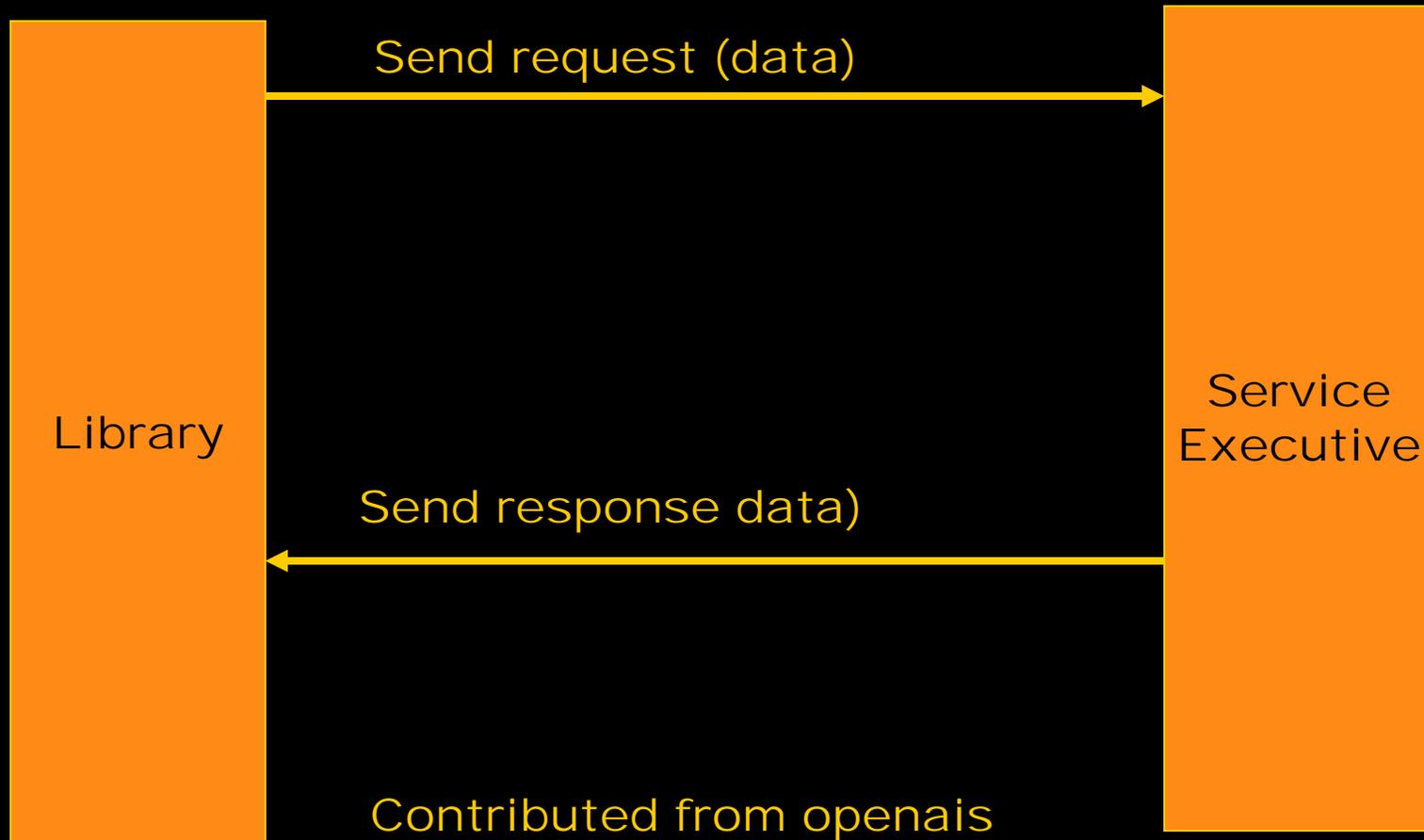
Contributed from openais Project to linux 2.6.3

Current Technology – Strings

- **Strings stored in 256 byte arrays**
- **String sent in almost every request within AIS**
- **Small requests = lots of overhead**

New Technology – Distributed Name Service

- **32 bit handle used to reference a name**
- **Name/string database synchronized after partition change**
- **Lookup of handle is O(1)**
- **Lookup of string uses hash table**

Current Architecture
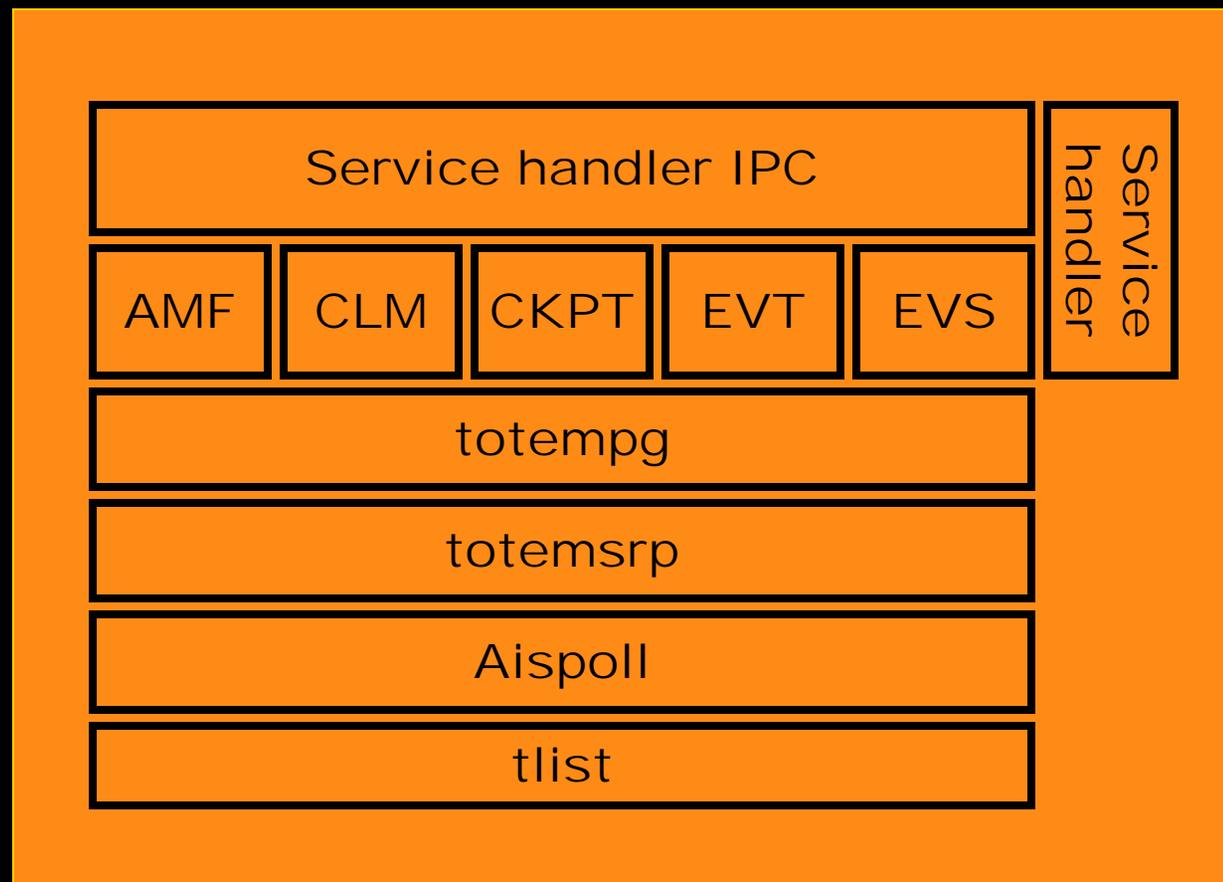
Future Technology – Live Update
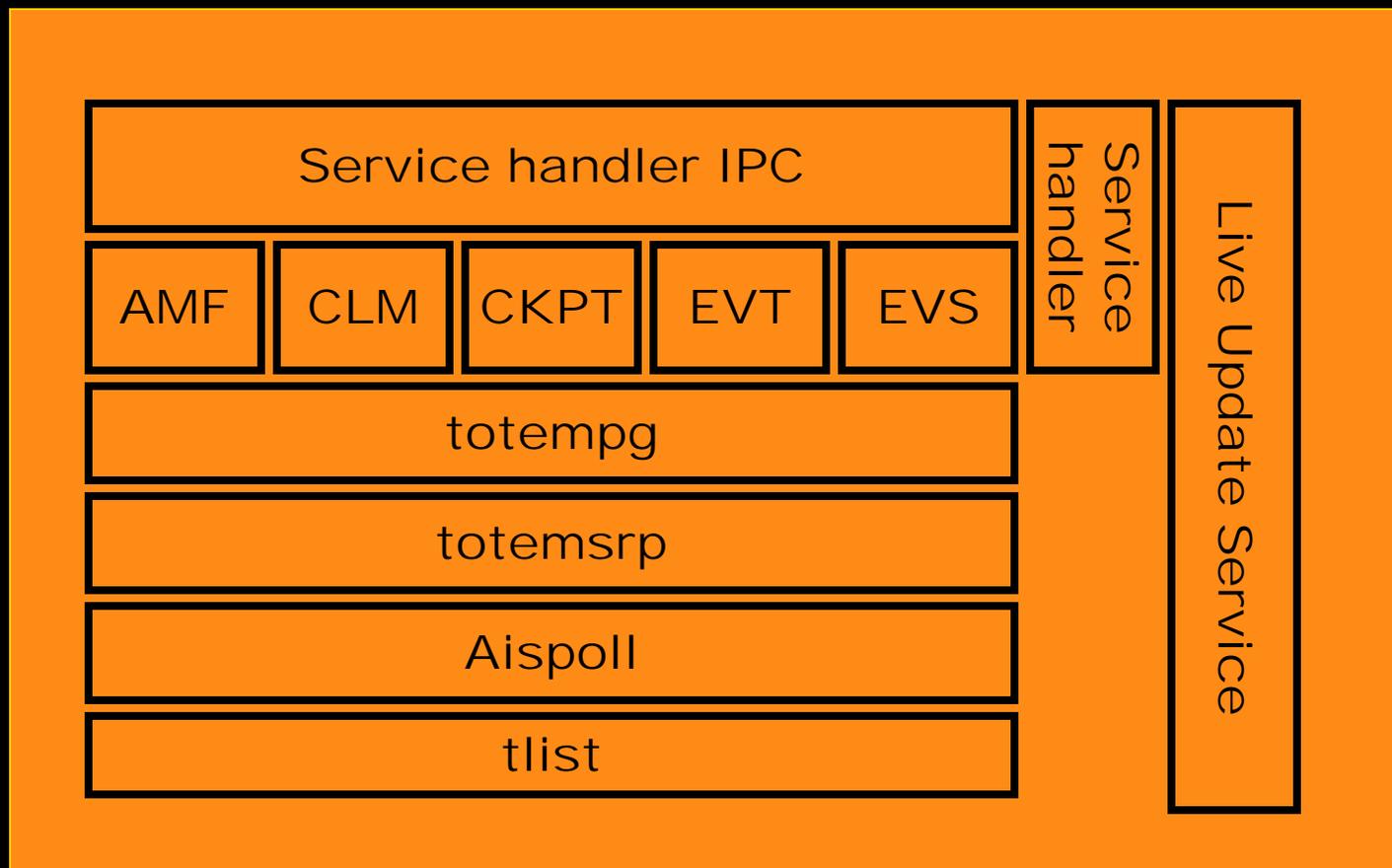
Current Technology – Secrecy & Authentication

- **HMAC/SHA1 used to authenticate messages**
- **SOBER128 used to encrypt data**
- **Current weakness is private key secrecy, lack of rekeying**

New Technology – Group Key Generation

- Choose one of the 6 published group key algorithms and implement
- Private key stored on each individual processor
- Public key for all processors stored on all processors
- Key used for encryption and authentication generated by math applied to public and private keys within group
- Supports arbitrary rekeying

New Technology - Manageability

- **Complete lack of external management of AMF components**
- **Perhaps a web interface to manage components and provide full AMF semantics**

And of course priority #1

- **Implement message service**
- **Implement distributed lock service**
- **Transition AMF to B.01.01**

The openais technomap

Release 1
- AMF service
- CKPT service
- EVT service
- CLM service
- EVS service
- B.01.01
- 85% code coverage
- SAFTEST run

Release 2
Release 1 plus:
- DLCK service
- MSG service
- RMD service
- AMF B.01.01
- Prototype multiring
- SEQPACKET
- AMF management
- Distributed name service

Release 3
Release 2 plus:
- Update to current spec
- Production multiring
- Live update
- Group key generation
- 90% code coverage

| Q1/05 | Q4/05 | Q4/06 |

CGL Analysis – We will do these:

- **CMS 1.0 – Cluster Membership Service**
- **CES.1.0 - Cluster Event Service**
- **CCS.1.0 Cluster Checkpoint Service**
- **CCM.1.0 Cluster Message Service**
- **CLS 1.0 Cluster Lock Service**
- **CAF1.0 Cluster Availability Framework**
- **CFH.1.0 Cluster Node Detection**
- **CFH.3.0 Application Failover Enabling**
- **CCM.2 Cluster Communication Service**
- **CAF.2.1 Ethernet MAC Address Takeover**
- **CAF.2.2 IP Takeover**
- **CCS.2.0 SAF_AIS Data Checkpoint Performance**
- **CMS.2.0 Dynamic Cluster Membership**
- **CCON.1.1 Run Diagnostics**
- **CCON.1.2 Boot Reboot Nodes**
- **CCM.4.1/CCM4.3 Group Messaging Protocol**

CGL Analysis – We wont do these (anytime soon):

- **CFH.2.0 Prevent Failed Node from Corrupting Shared Resources**
- **CSM.1.0 Storage Network Replication**
- **CSM.2.0 Cluster aware Volume Management**
- **CSM.3.0 Shared Storage Mirroring**
- **CSM.4.0 Redundant Cluster Storage Path**
- **CSM.5.0 Cluster Synchronized Device Hotswap**
- **CSM.6.0 Cluster Filesystem**
- **CAF.2.3 Deliberate TCP Session Takeover**
- **CMON.1 Cluster Node Monitoring**
- **CCON.1.1 Run Diagnostics**
- **CDIAG.1.1/1.2 Online Diagnostics**
- **CDIAG.2.1/2.4 Cluster Wide Diagnostic Info**

Conclusions

- **The openais project is making good progress**
- **The project has a competitive roadmap**
- **We are not the cure to missing implementations of requirements in CGL**

Join in

- **WEB**
  http://developer.osdl.org/dev/openais

- **Mailing List**
  openais@lists.osdl.org

We need docs, tests, code, designs.

There is still A LOT of design work to do come join in
on the early stages of the project.