PoD
PROOF on Demand

Current status and future plans

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ROOT Users Workshop 2013

http://pod.gsi.de

Different job managers

Job Manager plug-in system

| SLURM | SSH | PBS | Grid Engine | PanDA |
| AliEn | LSF | Condor | LoadLeveler | gLite |

PoD is shipped with a number of plug-ins to cover all major RMSs, such as local cluster systems and Grid.

If there is no RMS available, then the SSH plug-in can be used.
The SSH plug-in is also used to setup PROOF clusters on Clouds.

Set your private PROOF cluster up

Start
PoD Server

pod-server start

Set your private PROOF cluster up

Start
PoD Server → Submit PoD Jobs
using PoD Job Manager

pod-server start

pod-submit -r [*lsf* | *pbs* | *condor* | *...*] -q *myqueue* -n *100*
or
pod-ssh -c *pod_ssh.cfg* submit

Set your private PROOF cluster up

Start PoD Server	→	Submit PoD Jobs using PoD Job Manager	→	Check for Your PROOF Cluster

pod-server start

pod-submit -r [*lsf* | *pbs* | *condor* | *...*] -q *myqueue* -n *100*

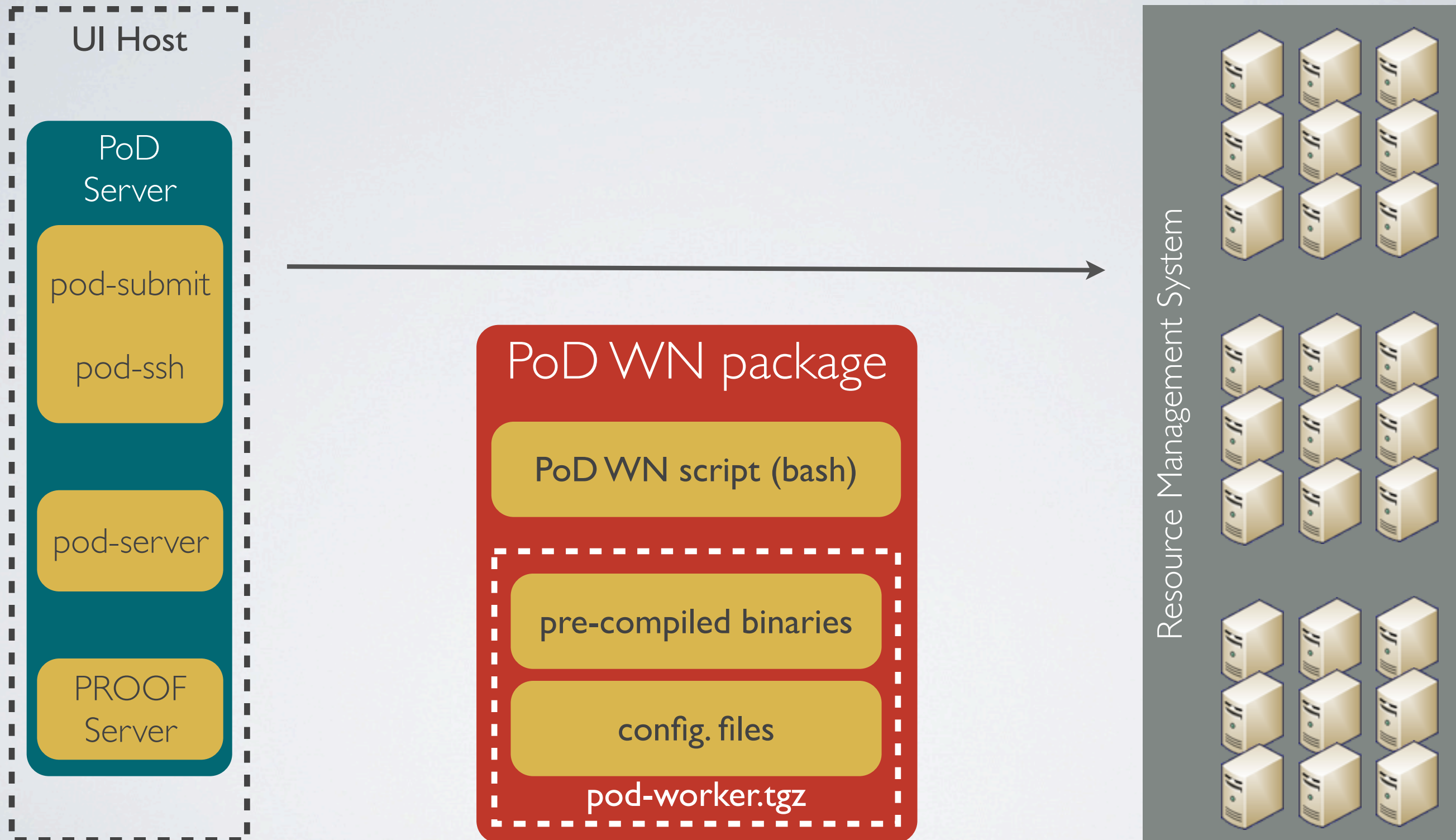or

pod-ssh -c *pod_ssh.cfg* submit

pod-info -l -n

PoD vs "Static" approach

a User

- • can entirely control his/her dynamic cluster,
- • can setup and use it on demand,
- • can dynamically change an amount of WNs,
- • can select a preferable master host,
- • doesn't need admins to take an action,
- • doesn't disturb other users,
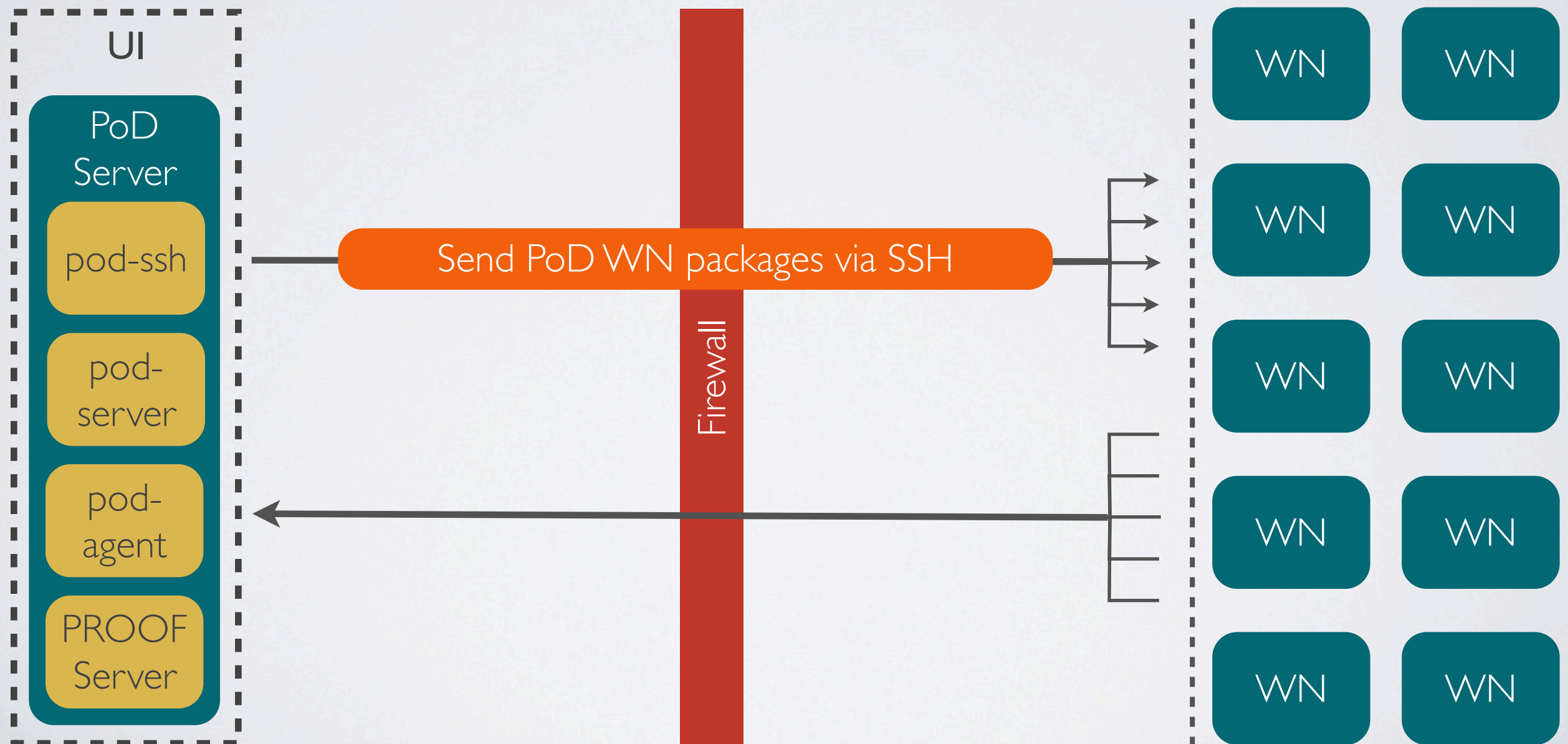- • is free to choose a ROOT ver. for services.

Binary Payload Attachment

UI Host

PoD Server
- pod-submit
- pod-ssh

pod-server

PROOF Server

PoD WN package

PoD WN script (bash)

pre-compiled binaries

config. files

pod-worker.tgz

Resource Management System

Binary Payload Attachment

UI Host

PoD Server

pod-submit

pod-ssh

pod-server

PROOF Server

PoD WN package

PoD WN script (bash)

binary payload attachment

Resource Management System

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PoD SSH

a simple CSV file as an input to the plug-in:

ID,	login@host,	ssh params,	WN work dir,	num of proof WNs
r1,	anar@lxg27.gsi.de,	-p24,	/tmp/test,	10
a2,	user@lxi001.kkk.es,		~/pod_wn,	
14,	doom@host.my,	-p22,	/opt/pod/,	

UI

PoD Server

pod-ssh

pod-server

pod-agent

PROOF Server

Firewall

Send PoD WN packages via SSH

WN WN
WN WN
WN WN
WN WN
WN WN

pod-remote: a thin client concept

pod-remote
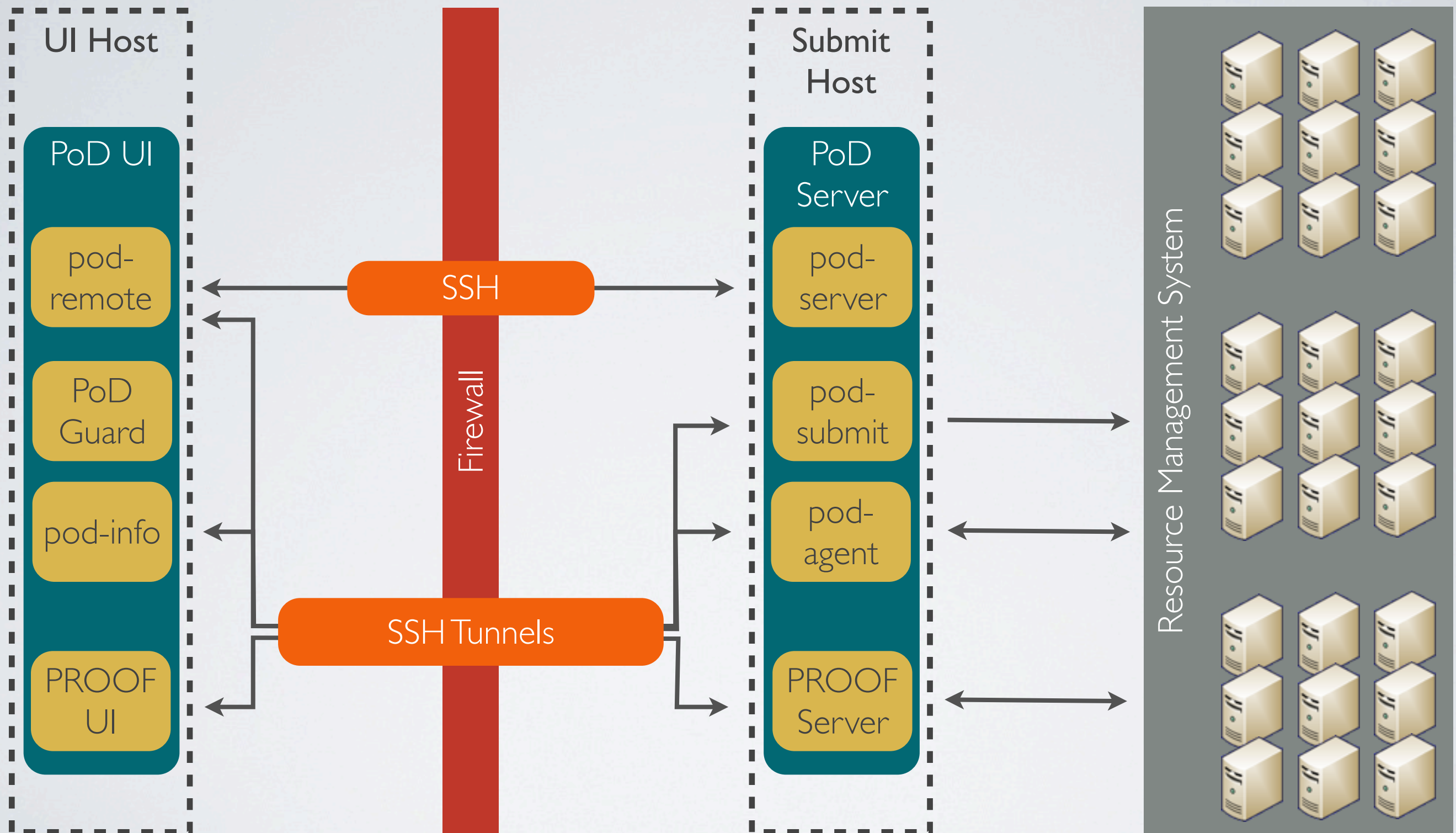
```
pod-remote --start \
           --remote anar@host.gsi.de:/PoD/3.11 \
           --env-local env_demac012.sh
```

```
pod-remote --start \
            --remote anar@host.gsi.de:/PoD/3.11 \
            --env-local env_demac012.sh
```

```
pod-info -sd
    PoD Server Type: remote (managed by pod-remote)
    XPROOFD [47445] port: 21001
    PoD agent [47450] port: 22001
    PoD agent port is forwarded via local port: 22001
    XPROOFD port is forwarded via local port: 21001
```

```
pod-remote --start \
           --remote anar@host.gsi.de:/PoD/3.11 \
           --env-local env_demac012.sh
```

```
pod-info -sd
    PoD Server Type: remote (managed by pod-remote)
    XPROOFD [47445] port: 21001
    PoD agent [47450] port: 22001
    PoD agent port is forwarded via local port: 22001
    XPROOFD port is forwarded via local port: 21001
```

```
pod-info -c
anar@localhost:21001
```

pod-remote --command "*pod-ssh -c /home/etc/ssh_hst.cfg submit*"

pod-remote --command *"pod-ssh -c /home/etc/ssh_hst.cfg submit"*

pod-info -ln
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worker manafov@lxi049.gsi.de:21001 (direct connection) startup: 1s
worker manafov@lxi049.gsi.de:21001 (direct connection) startup: 1s
worker manafov@lxi049.gsi.de:21001 (direct connection) startup: 1s
worker manafov@lxi049.gsi.de:21001 (direct connection) startup: 1s
worker manafov@lxi049.gsi.de:21001 (direct connection) startup: 1s
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worker manafov@lxi049.gsi.de:21001 (direct connection) startup: 1s
worker manafov@lxi049.gsi.de:21001 (direct connection) startup: 1s
worker manafov@lxi054.gsi.de:21001 (direct connection) startup: 2s
worker manafov@lxi054.gsi.de:21001 (direct connection) startup: 2s
worker manafov@lxi054.gsi.de:21001 (direct connection) startup: 2s
worker manafov@lxi054.gsi.de:21001 (direct connection) startup: 2s
...

```
TProof::Open(gSystem->GetFromPipe("pod-info -c"));
```

```
TProof::Open(gSystem->GetFromPipe("pod-info -c"));
```

```
TProof::Open("pod://")
```

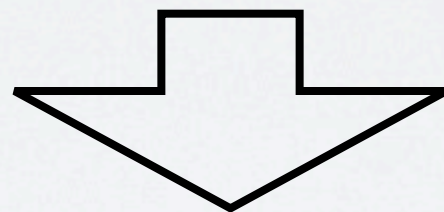```
TProof::Open(gSystem->GetFromPipe("pod-info -c"));
```

```
TProof::Open("pod://")
```

```
pod-remote --stop
```

no need to write all arguments when using pod-ssh, pod-remote

pod-remote --start \
        --remote *anar@host.gsi.de:/PoD/3.11* \
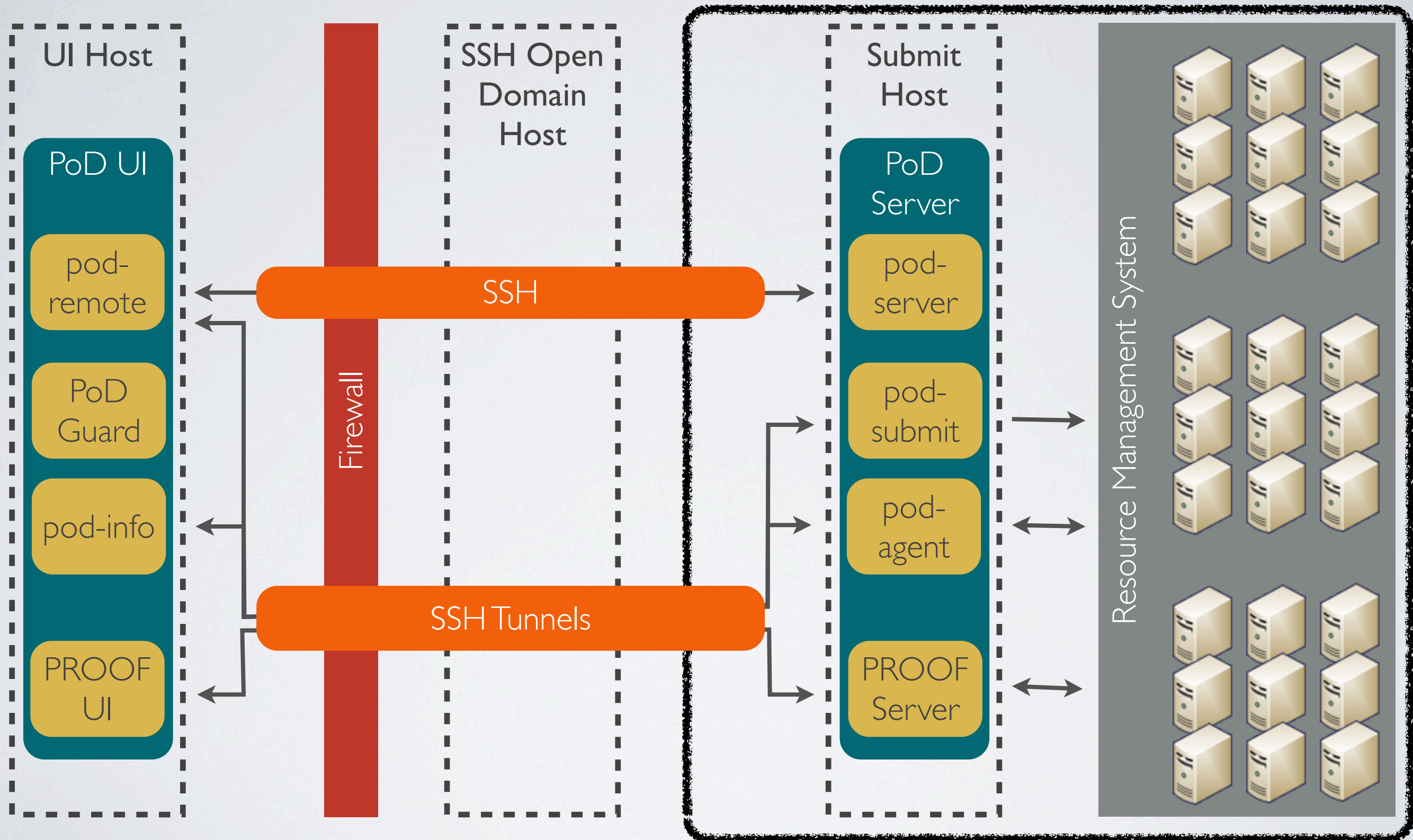   --env-local *env_demac012.sh*

pod-remote --command "*pod-ssh -c /home/etc/ssh_hst.cfg submit*"

pod-remote --start
pod-remote --command "*pod-ssh submit*"

pod-remote: via open domain

PoD 4.0

- ## New CLI.
  pod start <args to "start">
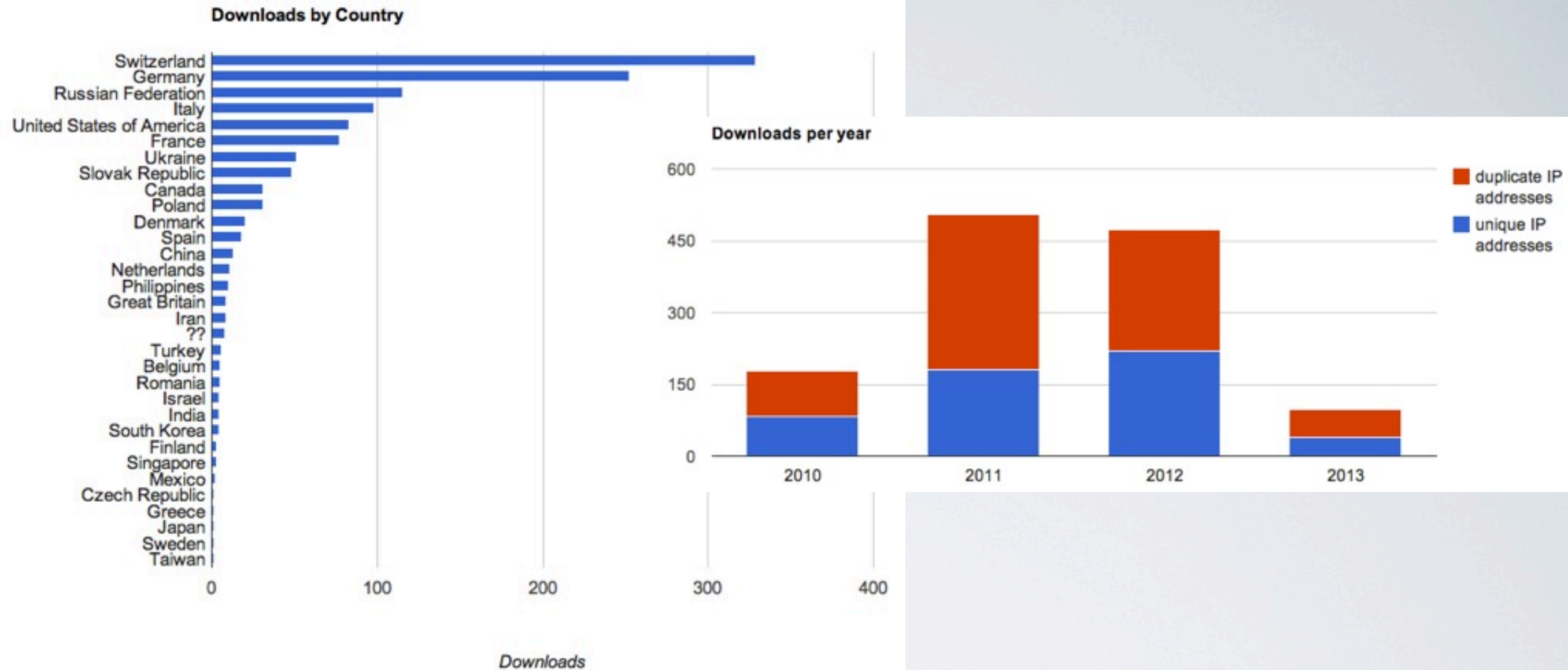
  pod server <args to "server">

  pod info <args to "info">

  ...

- ## UI - Server communication.

- ## Dynamic Master architecture.

Dynamic Master architecture

Downloads by Country
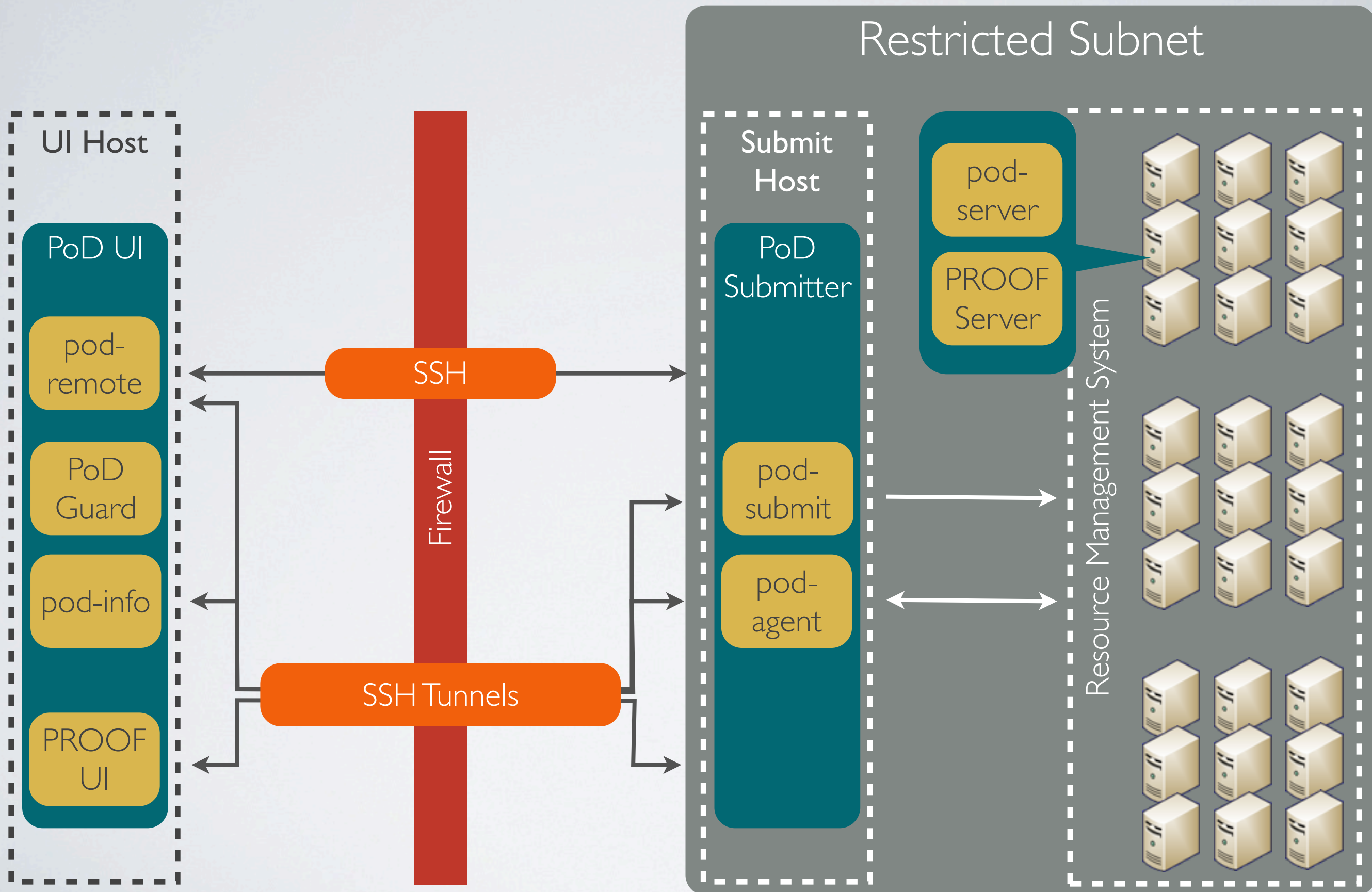
Downloads per year

~**1300** Downloads since June, 2010 (was ~900 in 2011)
31 countries (was 24 last year)
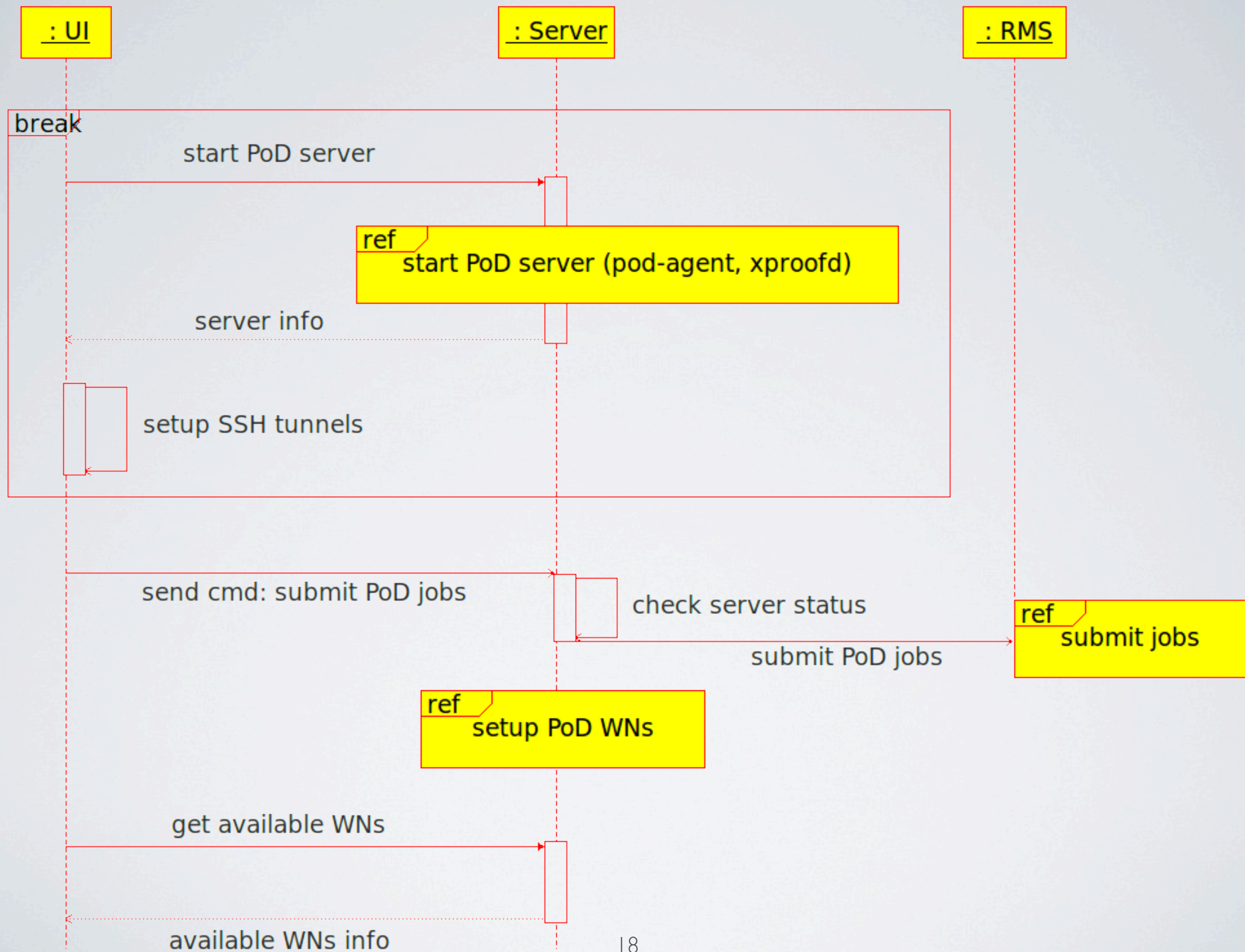**220** Unique Downloads per year (was ~180 in 2011)

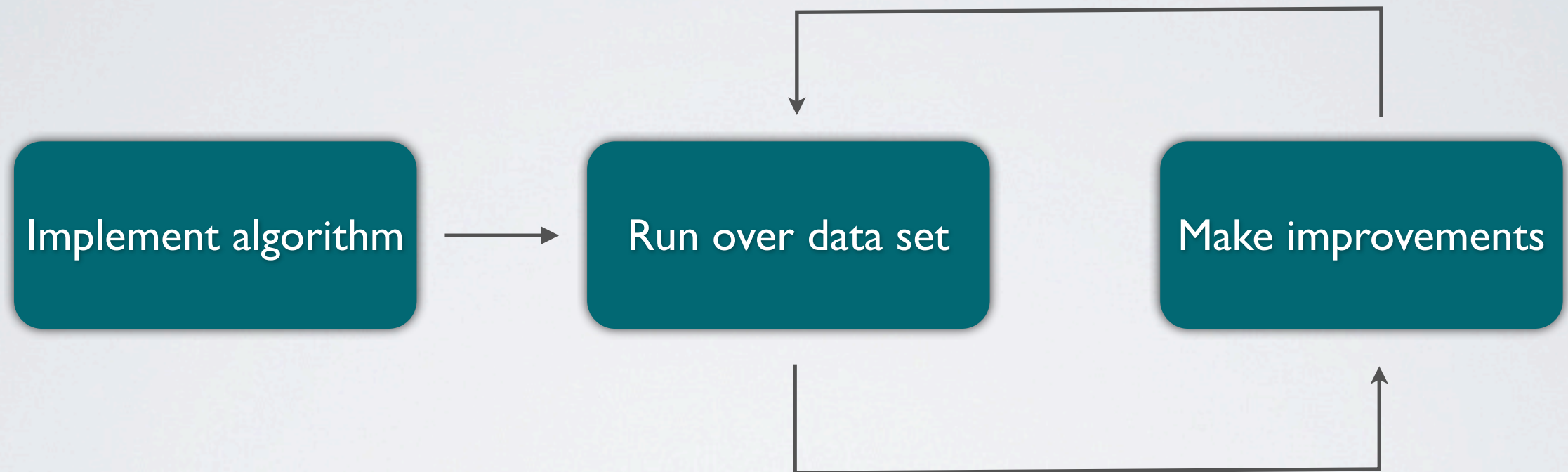PoD is available on cvmfs:
/cvmfs/sft.cern.ch/lcg/external/PoD/

PoD is also an official part of ATLASLocalRootBase package:
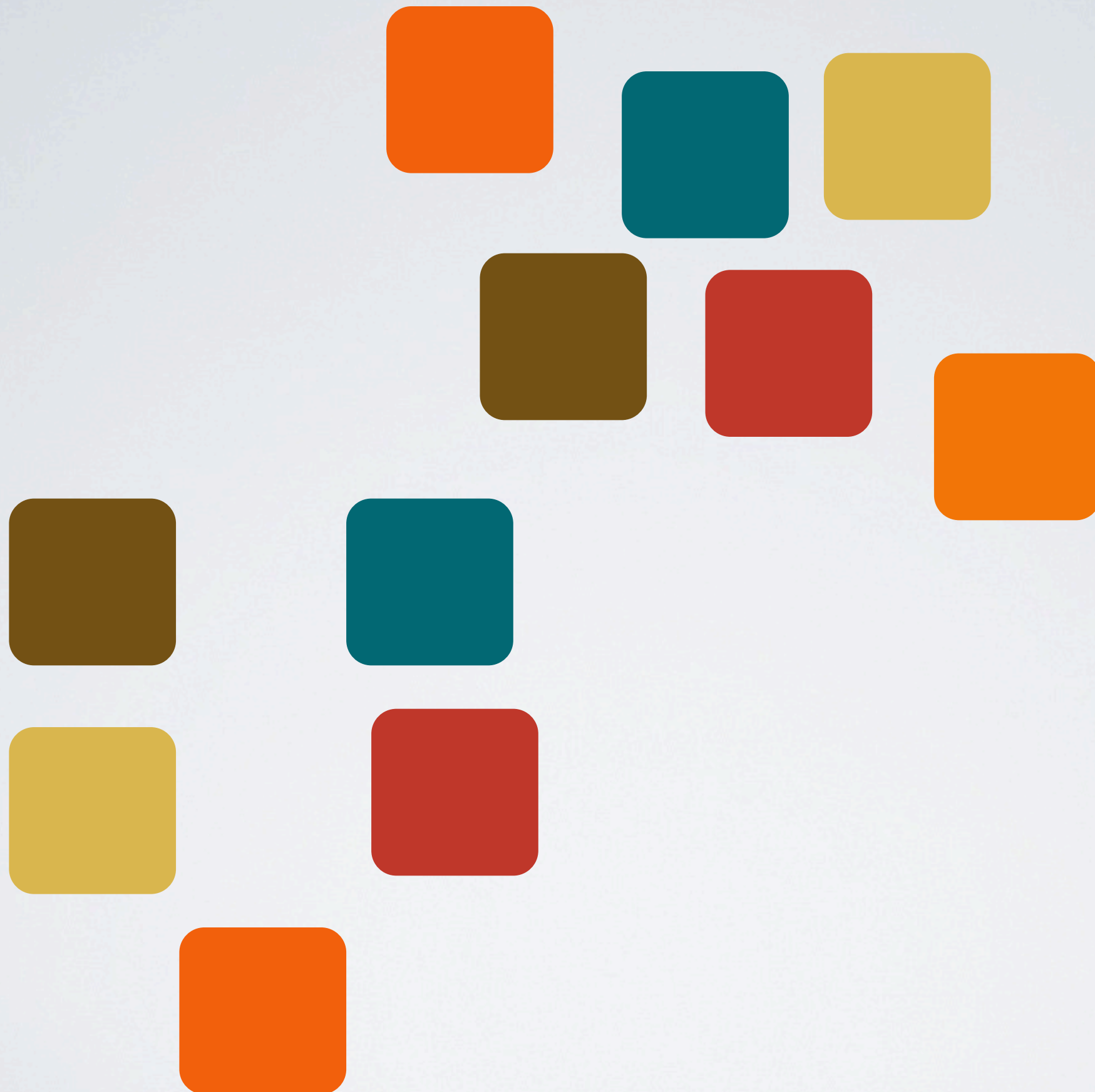https://twiki.atlas-canada.ca/bin/view/AtlasCanada/ATLASLocalRootBase#Using_PROOF_on_Demand_PoD

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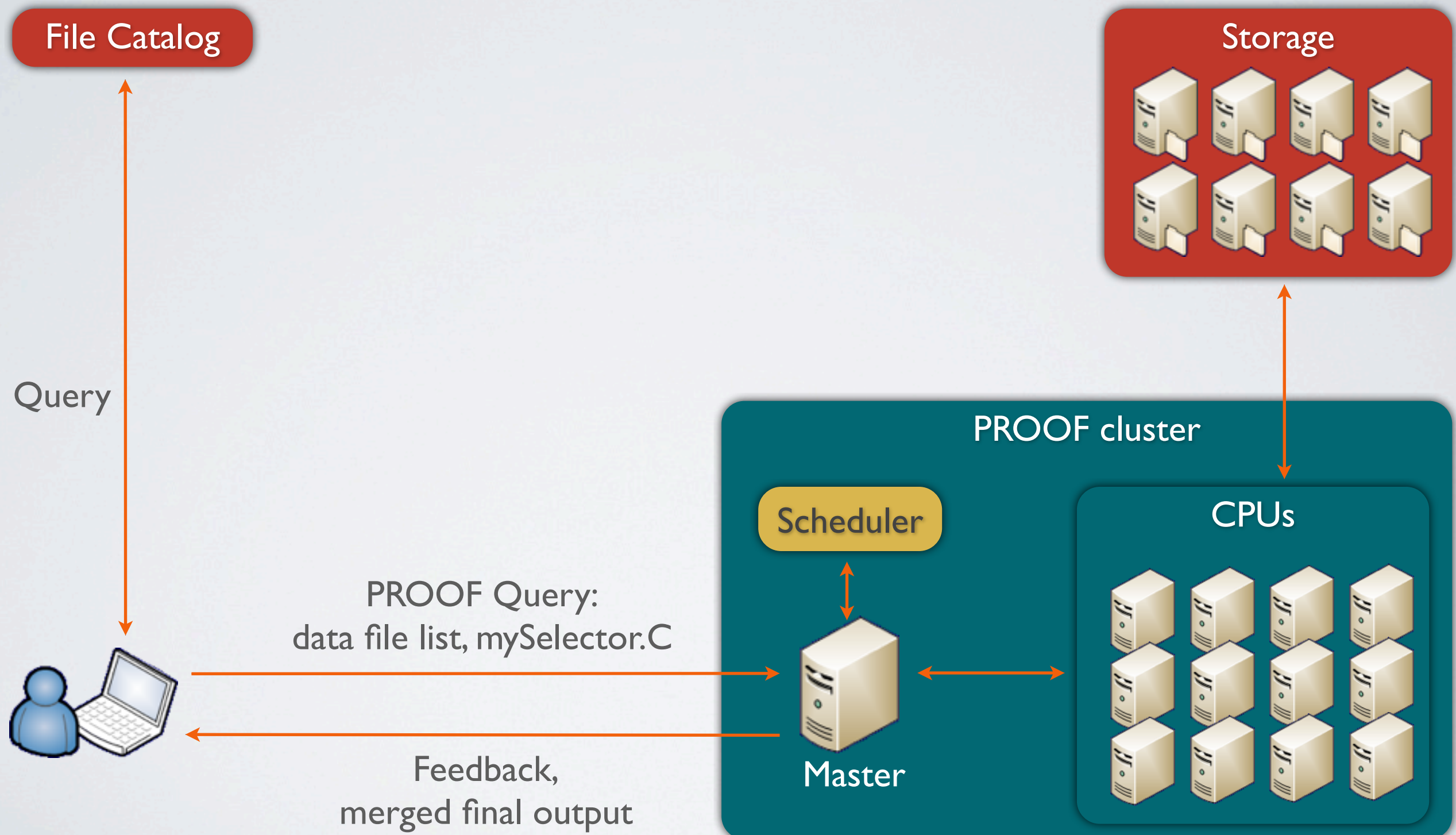# BACKUP

HEP DATA ANALYSIS

Implement algorithm → Run over data set   Make improvements

Typical HEP analysis needs a continuous algorithm refinement cycle

PROOF

File Catalog

Storage

Query

PROOF cluster

PROOF Query:
data file list, mySelector.C

Scheduler

CPUs

Master

Feedback,
merged final output