PMIx: Debuggers and Fabric
Debugger/Tool Features

- Co-launch/co-location of daemons
  - At initial app spawn
    - Co-launch
  - Upon attach
    - Spawn w/co-location

- Launch control
  - Stop-on-exec, stop-in-init, stop-in-app
  - Release method spec

- Forwarding of IO
  - To/from debugger daemons
  - To/from app being debugged

- Query support
  - Global and local proctable
  - PMIx server and application procs

- Direct/indirect launch support
  - Forward, set/unset/modify envars (e.g., LD_PRELOAD)
  - Launcher directives
    - Modify local fork/exec agent
    - Replace launcher daemons
Direct Launch

RM
PMIx Server

RM
PMIx Server
Dbgr Dmn

Proc
Proc

Co-launch
Two-stage launch
Indirect Launch

RM
 PMIx Server

PMIx_Spawn

MPIexec
 PMIx Server

PMIX_LAUNCHER_PAUSE_FOR_TOOL

fork/exec

...
Indirect Launch

Tools: only connect to one server at a time
Indirect Launch

Co-launch
Two-stage launch
Attach to Running Job

RM
PMIx Server

 mpiexec
PMIx Server

mpid
PMIx Server

Proc
Proc

Launch Daemons
Attach to Running Job

RM
PMIx Server

PMIx Server

mpixexec
PMIx Server

mpid
PMIx Server

Dbgr Dmn

Proc

Proc

PMIx $10^{18}$
Attach to Running Job

Launch Daemons

Direct or Indirect Launch
Web Links

• [https://pmix.org](https://pmix.org)
  - Home page for PMIx

• [https://pmix.org/pmix-standard/](https://pmix.org/pmix-standard/)
  - Standards process, links to headers, RFCs
  - Roles/responsibilities of RMs and other system management components

• How-to guides
  - [https://pmix.org/support/how-to/example-direct-launch-debugger-tool/](https://pmix.org/support/how-to/example-direct-launch-debugger-tool/)
  - [https://pmix.org/support/how-to/example-indirect-launch-debugger-tool/](https://pmix.org/support/how-to/example-indirect-launch-debugger-tool/)
Assigning Procs->Daemons

Query:
- Local proctable
- Local rank

PMIX_DEBUG_JOB
Assigned in launch data
Assigning Procs->Daemons

PMIX_DEBUG_JOB
Assigned in launch data

Query:
- Local proctable
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Assigning Procs->Daemons

PMIX_DEBUG_JOB
Assigned in launch data

Query:
- Local proctable
- Local rank
General Capabilities

• Specify mechanism for “hold”
  - Query RM or launcher for support
  - stop-on-exec, stop-in-init, or stop-in-app

• Specify app release mechanism
  - PMIx event, signal, …

• Register for events
  - Termination of debugger job and/or daemons
  - Termination of app job and/or procs
Forwarding of Output

RM

PMIx Server

Sent via PMIx

PMIx Server

Proc

Proc

Dbgr Dmn

stdout stderr
Forwarding Stdin
Forwarding Stdin

PMIx Client Collects

Sent via PMIx

Tool Collects
Forwarding Stdin

RM
- PMIx Server

MPIexec
- PMIx Server

mpid
- PMIx Server

Dbgr Dmn
- Proc
- Proc

PMIx Client
- Collects
- Sent via PMIx
- Tool Collects

stdin
Fabric Features

- Harvest/forward envars
  - Include/exclude
- Get/set security keys
- Get/forward setup “blob”
- Deliver setup “blob” prior to local process spawn

Support:
- OmniPath (master)
- TCP (branch)