PILOT 2 UPDATE

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Pilot 2 – Recent developments

- ZIPMAP support
  - Done – for now only updating job parameters (filtering) so should be compatible with Archive tf (to be tested)
- Event service updates
  - AES workflow tested (successfully) by W. Guan (February)
- Full implementation of trace report (i.e. for all copy tools)
- Retriable errors for user jobs
- Transfer time-outs in copytools
- Recent and relevant Pilot 1 changes migrated into Pilot 2 (double checked since May)
- Many new error codes implemented (total: currently at 90 error codes)

Pilot 2 – Examples of new error codes

- Pilot 2 error codes listed here: https://twiki.cern.ch/twiki/bin/view/PanDA/Pilot2ErrorCodes

1313	NOSTORAGEPROTOCOL	No protocol defined for storage endpoint
1315	UNKNOWNTRFFAILURE	Unknown TRF failure
1316	RUCIOSERVICEUNAVAILABLE	Rucio: Service unavailable
1318	COMMUNICATIONFAILURE	Failed to communicate with server
1320	LOGFILECREATIONFAILURE	Failed during creation of log file
1321	RUCIOLOCATIONFAILED	Failed to get client location for Rucio
1322	RUCIOLISTREPLICASFAILED	Failed to get replicas from Rucio
1323	UNKNOWNCOPYTOOL	Unknown copy tool
1324	SERVICENOTAVAILABLE	Service not available at the moment
1325	SINGULARITYNOTINSTALLED	Singularity: not installed
1327	UNREACHABLENETWORK	Unable to stage-in file since network is unreachable
1328	PAYLOADSIGSEGV	SIGSEGV: Invalid memory reference or a segmentation fault
1329	NONDETERMINISTICDDM	Failed to construct SURL for non-deterministic ddm (update AGIS)
1330	JSONRETRIEVALTIMEOUT	JSON retrieval timed out
1331	MISSINGINPUTFILE	Input file is missing in storage element
1332	BLACKHOLE	Black hole detected in file system (consult Pilot log)

34 new error types introduced
(many old removed)

Pilot 2 – Missing pieces / known issues

- Event service updates
  - A few (4) error codes still need to be implemented in the event service code
  - Prefetcher support
- Benchmarking support
  - Will be part of Services API, easily pulled in and used by e.g. new benchmarking transform
  - API now in development
- mv stage-out broken
  - Internal Pilot issue to be looked at asap
- Extension of Pilot workflows (next slide)

Pilot 2 Workflows

- A Pilot "workflow" is an execution path for a given pilot task

- Selected using pilot option(s)

  - E.g. `-w generic_hpc --hpc-resource titan`

Workflow	Explanation	Status
Grid	Standard/default workflow used on grid sites	Done
HPC	Pilot code used on HPCs. Plugins needed for each resource (Titan in production)	Done/in progress
Input file stager	Pilot only stages in data (ATLASPANDA-477)	Concept
Payload+stage-out	Pilot executes payload and stages out data (ATLASPANDA-477)	Concept
Benchmark	Pilot only executes benchmark suite	Concept

HPC Pilot – Status and Plans

- Developer info with technical details regarding HPC Pilot workflow and plugins
  - Available at https://github.com/PanDAWMS/pilot2/wiki/HPC-workflow
- HPC resource plugins
  - Plugin for Titan already developed and used in production since last year (D. Oleynik)
  - Skeleton Pilot 2 plugins exist for ALCF, BNL, NERSC, Summit
- Access will be granted to Summit soon
  - Harvester + Pilot 2 will be setup asap to test e.g. ML payloads
- Yoda/Droid integration to be discussed this (with D. Benjamin)
  - Expect to begin with using Pilot 2 defined error codes in Yoda/Droid asap
- Planning to submit a CHEP 2019 abstract about HPC Pilot

Pilot Source and Version

- Idea: use existing AGIS field 'pilotversion' to select Pilot version for given PQ
  - Will facilitate Pilot 2 commissioning
- Harvester will check this field before downloading the Pilot source tarball
- Status: being implemented in Harvester
- Note: Default field value should be Pilot1
  - Other allowed value: Pilot2

Pilot 2 – Commissioning on the grid (1/2)

- Successful tests on Nordugrid by D. Cameron
  - Two identified issues (long time for pilot to end, JSON from AGIS instead of CVMFS), now resolved
- "Accidental" commissioning on couple of IT queues a few weeks ago
  - Pilot 2 was launched my mistake by wrapper for ~a day
  - Minor issue with Pilot 2 was identified and fixed
  - Bigger issue was later realized by EventIndex team
    - Number of events not read correctly from jobReport -> missing metadata in DB
- Running production tasks on CERN-EXTENSION_HARVESTER_1/2 since last week
  - UCORE queues, rucio copy tool, Pilot 1 running on CERN-EXTENSION_HARVESTER_1, Pilot 2 running on CERN-EXTENSION_HARVESTER_2
  - Help provided by F. Berghaus (will be involved in pilot migration)
  - Minor issues with Pilot 2 identified and fixed

Pilot 2 – Commissioning on the grid (2/2)

- Plan:
  1. Run for a few more days on CERN-EXTENSION_HARVESTER_1/2 with different tasks/job types
     - Compare jobs run by Pilot 1 and 2
     - Task plan setup by Ivan Glushkov (sim, merge, rec, AOD merge, der, NTUP merge)
       - Currently looking at some new DDM related failures
  2. Try a few more production queues for a few days, followed by migration
  3. Migrate most production queues in cloud to use Pilot 2
     - Satellite queues; don't bother with using _1/2 clone queues
  4. Repeat for remaining clouds
- Migrate user analysis queues, gradually
- Avoid queues with non-supported copy tools
  - Some 25 queues still use lcgcp (storm/dCache as well?)