DPM and Dynafed 2020

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Intro - What’s in this presentation

• Describe the path that led to DPM and Dynafed
• Understanding what constitutes the effort of maintaining these systems
• Hint at the milestones that the systems will have to face

• Promote once more the “open source” character of the modern DPM/Dynafed components
  • … which is the best chance for longer life and support with a healthy coordinated community
Modern DPM and Dynafed: DMLite

- In 2010-2012 the CERN “Software for Distributed Computing” group started developing the DMLite framework and libs. The activities were part of the EU EMI project.
- DMLite is an abstract library to build systems for managing storage.
- DMLite spurred in 2010-2012 the writing of Dynafed.
- The HTTP client Davix (used also by ROOT) came from Dynafed, and found an important place in the present and future of computing at LHC scale.
- DMLite was a shy attempt to incrementally rewrite DPM, which was facing code obsolescence at the horizon.
- This focused in 2017-2019 with the DOME daemon.
  - Made possible to implement new features, fix historical troubles and obsolescence and improve dramatically robustness and scalability of DPM.
DMLite ➞ DPM and Dynafeded

- DPM: traditional “GRID storage element” system based on a DB catalog and the concept of “disk pools” and a full-featured redirector node (“head node”)

- Dynafed: minimalistic, very flexible HTTP(s) dynamic redirector
  - We can see it as a DPM without DOME and not needing a static catalog
  - The catalog is built on-the-fly in memory
  - We used to call this “storage federations”, yet it became more than this when someone realised it works very well with S3 and caches in general

- Both systems support things like TPC, X509, VOMS, Macaroons, OpenID-Connect
- DPM comes with a puppet-based pre-made do-it-all config
DPM Status - November 2020

- Total disk space: 96PB
- Number of instances: 88 (BDII says 71 in 59 sites)

- The old components (dpnsdaemon, srm, dpm-daemon, rfio…) are deprecated since September 2019
  - No urgency, they will stay in the EPEL7 repos, simply not being ported to EPEL8 and not updated with newer version numbers

- Well up to date with the features needed in WLCG (e.g. Macaroons and OpenID-Connect, cross-protocol checksums, TPC, easier multi-site, pools as caches)

- The DPM upgrade TF has tracked/promoted the upgrade progress and the enabling of the new components (DOME) and of the WLCG Storage Reporting Record
  - https://twiki.cern.ch/twiki/bin/viewauth/LCG/DPMupgrade

- Roadmap of stability: the tech goals have been reached, hence no revolutions are foreseen in the DPM development

- Given the stability of the platform, the dev deltas that we see will mostly be little fixes and polishments, e.g. CLI commands, security fixes, etc.
Dynafed status - November 2020

- Relevant deployments:
  - BOINC CMS@home to store files in S3 at CERN
  - Canadian S3-based cloud (with redirectors at CERN)
  - ECHO at RAL
- Differently from DPM, we don’t track Dynafed installations
- Can be configured with TPC and OpenID-Connect
- Particularly flexible, well documented authorization subsystem
Maintenance main ingredients

- Facilities at CERN:
  - GitLab repository group: https://gitlab.cern.ch/lcgdm
  - Jenkins build system: https://jenkins-lcgdm.web.cern.ch/

- Semi-automatic test procedures
  - Small testbed
    - Seriously testing the development releases of a plethora of other components as a side effect, e.g. xrootd, voms, davix, gfal, etc.

- Precise, simple, written down test/release workflow
  - Pretty quick turnaround in case of urgency
  - A few brave sysadmins also help checking things in their sites
  - EPEL is the last step of the release

- In the last years the development effort has been negligible with respect to the running these necessary steps
Publish to Fedora/EPEL8

- The code does not need fixes, or maybe just minimal things
- Petr Vokac has already contributed some needed bits
- The specfiles might need juggling
- The transition to Python3 is not fully complete yet
- Full status: https://twiki.cern.ch/twiki/bin/view/DPM/DpmEpel

- The effort would be also about upgrading the build/test system and the testbeds dpmhead-trunk and dpmhead-rc
  - Xlation: “fight with specfile, Openstack, Jenkins and Puppet”
  - Hey! There can be no releases without builds/tests!

- CERN will not contribute directly the EPEL8 porting, as per statement
  - https://indico.cern.ch/event/813745/contributions/3766117/note/
  - This means that somebody could be accompanied to do it
Summary: Roles involved

- Which roles are necessary for a project in maintenance mode?
  1. Community (utilises, discusses and contributes)
  2. Partial time dev (reviews contribs and contributes himself sometimes)
  3. QA manager (maintains the test clusters dpmhead-*, e.g. for DOMA tests or nightly internal ones, reviews the tests results)
  4. Build/test system maintenance (Jenkins+OpenStack+Puppet take some time to maintain)
  5. Epel master (for the final release steps)

- For DPM, points 2, 3, 4 have been inherited by Fabrizio
  - Point 5 will soon be vacant
AA - EPEL packager wanted

- Oliver Keeble moved to other things, and can’t anymore guarantee this role
- Fabrizio never was an EPEL packager
- In absence of a packager, we can’t push to EPEL even small fixes (e.g. security) from now on
  - And coincidence wanted that we had a security fix in the pipeline now (thanks Oliver and Petr for making possible v1.14.2)
- The srpms to push are just two
  - dmlite (contains all DPM and dmlite)
  - dynafed (depends on dmlite)
- These packages will be orphaned in the next few weeks (by Fedora policy recommendations)
- (And maybe this is the right time to update these things in UMD, to make sure that a coherent repo stays)
Status

- Very stable service and codebase
- The code is in Gitlab, totally open
- For DPM, the scalability range is pacifically over the “tens of PBs”, the performance is more than adequate for this. Dynafed is one level up, depending on the usage, being a more lightweight-featured system
- Thanks for the contribs :-) :-) 
- Will stay in EPEL7 until EPEL7 exists
- We see only reasons for DPM/Dynafed to work well in the next few years, also depending to the vitality and interest of the community

- Oliver Keeble has been the previous EPEL packager
- No plans so far to push to EPEL8, a non-CERN packager could do it
Conclusions

• Modern DPMs profit from a healthy technical platform. This includes Dynafed as a successful spin-off
• The system accommodates all the current requirements (including TPC and bearer tokens) and is technically well-placed to accommodate future ones that may come

• Discussions are ongoing about the directions for the DPM support, both from the point of view of the sites, EGI and of the WLCG Operations team
• Overall, the DPM project is more than 15 years old and was incrementally refurbished and put up to date with the modern requirements
• We all put hope into the cooperation of the DPM/Dynafed community, WLCG, CERN and EGI so that such an important asset benefits sites for many more years

• Now… it’s time for free questions and clinic