Introducing the dCache info service



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Who are you, listening to this?

- You are one of:
 - a member of the dCache collaboration,
 - a Tier-A integration collaborator (hello Tanja!),
 - a Tier-1 site-admin,
 - a valued college from CERN (hello Flavia!).
- What you will understand after listening:
 - An understanding of how the info service works.
 - Some ideas about how the data may be accessed and used.



Overview of talk

- The goals and non-goals of the info service.
- A medium-to-high level view of how it works.
- An overview of the provided information.
- How to obtain "live" information.
- Summary.



What is the info service?

- A robust, best-effort, "one-stop shop" overview of the current status of a dCache instance for external consumption.
 - Robust: the info service will continue to work independently of the rest of dCache.
 - Best-effort: there may be delays in information being updated (1 minute order-of-magnitude).
 - One-stop shop: you should be able to get all the information you require.
- It decouples updates from queries:
 - Querying is fast and robust



What the info service is not...

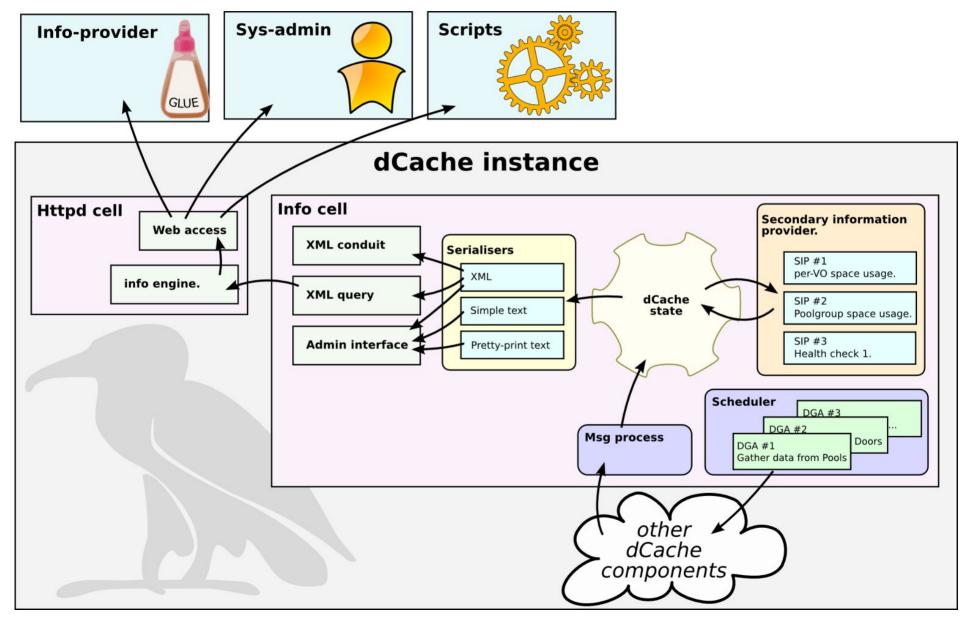
- Not used by other dCache components [*]
 - As this would:

[*] this is a small white lie: more details in the next slide

- break dCache's distributed architecture and introduce a (new) single point-of-failure,
- increase latency in information propagation,
- Doesn't provide historic data:
 - Duplicating what sites (almost certainly) already have:
 - Ganglia, Nagios, LEMON, Mondin, Zabbix, ZenOSS, ...
- It is not an info-provider:
 - although the new WLCG GLUE info-provider is a customer of the info service.



How it works.



How updates are scheduled

- Data-Gathering Activities (DGAs) schedule fresh data requests.
 - DGAs give strong control over how often messages are sent.
 - We're careful not to over-burden components.
- Reply messages are processed independently.
 - Info cell is robust against messages being lost or the replies delivered out-of-order.
 - Allows for asynchronous updates: much faster updates, low bandwidth overhead (W.I.P.)





- Derived data is the set of metrics calculated from other data within the state tree.
 - For example, space.total metric of a poolgroup is the sum of all space.total metrics of member pools.
- A Secondary Information Provider (SIP) calculates derived data.
 - Only triggered when *important* metrics change value.
- Uses:
 - Calculate aggregated space statistics (current)
 - High-level internal health checks (under investigation)



Storage in a tree

- Most metrics are held for finite time.
 - When time expires, they are automatically flushed.
 - Robust against stale information.
- A serialiser generates representations of state.
 - Adding new output formats is easy.
- Tree storage is abstracted.
 - Currently only uses memory, so serialisation is fast.
 - Structure is not hard-coded in the storage.
 - Storing new branches and/or metrics is easy.



What information is provided?

- Shallow structure with cross-links.
 - Normalised data: metrics appear only once.
- The following top-level branches exist:
 - summary: various aggregated information,
 - All other top-level branches are lists of items (as branches) with item-specific information below.
 - These lists include: pools, poolgroups, links, linkgroups, domains, doors, reservations.
- There's too much information to detail here.



Tiny fragments of state tree

reservation created metric a -"2008-06-11T12:42Z" metric name"simple" type"stri "Jun 11, 14:42:30 CEST metric name's metric name - authorisation metric name's metric nam matric "NEARLINE space metric ner metric ner "30000" metric na metric a • metric a "80001" + metric and CUSTODIAL reservation recreated + metric -"2008-05-17T08:34Z" metric name unte -1213691681 metric none'smple" type'strie "Jun 17, 10:34:41 CEST" metric name of metric name's · metric -70000 · metric · - "ONLINE" + space metric metric a metric nor metric no + metric name in + metric na "REPLICA" reservation · created "2008-06-11T12:42Z" metric name units" + metric on "Jun 11, 14:42:09 CEST · metric composite to and state -RESERVED + metric name Trie authorisation metric nam metric nam metricos "NEARLINE" , space metric na metric name" metric and metric

- dCache



troducing the dCache info service

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How do I start the info service?

- Configure dCache so it's started on a node.
- ... or start it manually:
 - /opt/d-cache/bin/dcache info start
 - (optionally) have a cup of coffee (2—3 minutes) whilst initial set of data is populated.
- Start querying the information.
- No configuration needed for the info service [*].
 - [*] The GLUE info-provider *does* require careful configuration; but the info-provide is a separate, distinct component from the info service.



Accessing the information

- Via the admin interface
 - Commands for navigating state, like: cd, ls, pwd.
 - Choice of output format
- Via XML Conduit
 - A TCP connection get complete state as XML.
- Web front-end
 - Preferred method, but requires the httpd cell.
 - For example:
 - http://dcache.example.org:2288/info
 - http://dcache.example.org:2288/info/pools





- Info service provides a best-effort overview of a dCache instance.
- Maintaining state and divulging information are decoupled:
 - fast, robust.
- Supports some advanced features:
 - Derived data (re-)calculated as state changes.
 - Multiple output formats and transports.
- If additional metrics, data formats or transports are needed, they can be added.