The Bulk service and WLCG TAPE API support in dCache

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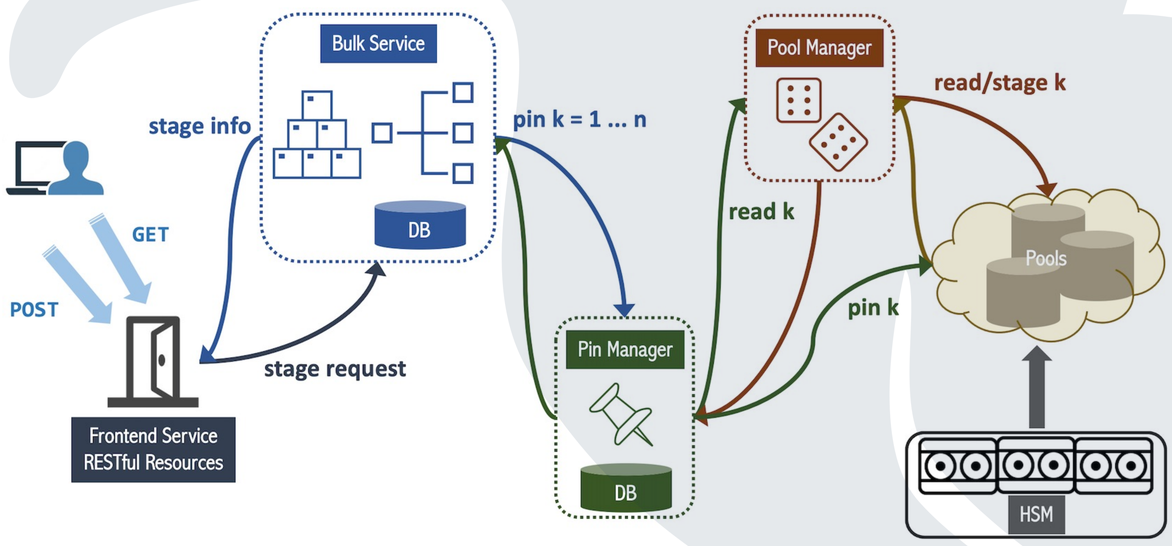
Staging via REST API and Bulk service

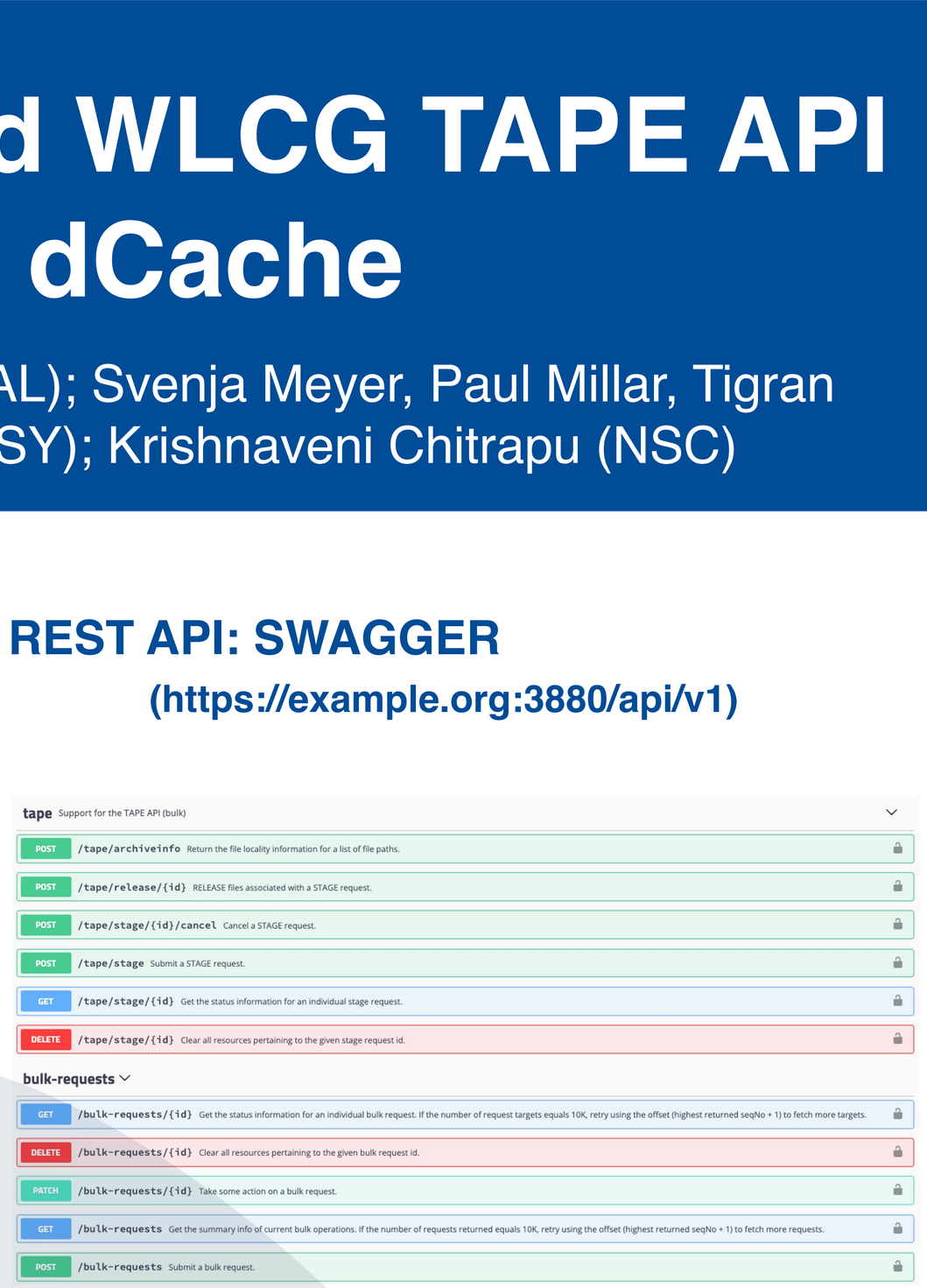
As part of the WLCG collaboration, sites deploying dCache will require support for the TAPE REST API allowing for massive recall of files from tape. dCache implements the specified resources in its Frontend service, relaying the requests to a general-purpose Bulk service for handling. Similarly, the status of a request is also obtained via a RESTful query to the Frontend which retrieves the information from the Bulk service. Policies affecting throughput, number of requests per user and maximum files per request are all configurable.



dCache: Staging Interactions

REST API: SWAGGER

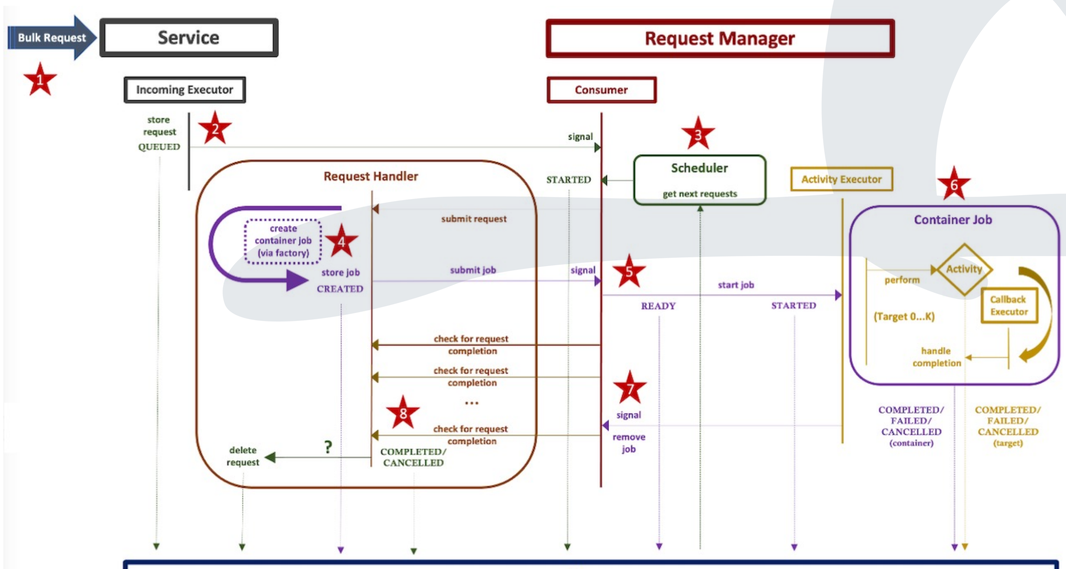
(https://example.org:3880/api/v1)



The dCache Frontend provides a SWAGGER page which describes the REST API and allows the user to try out the various resources.

Lifecycle of a Bulk request

1) Service receives request message. 2) Service stores unprocessed request, signals manager. 3) Consumer retrieves next requests from scheduler. 4) Request submitted to handler, which creates and stores container job. 5) Job submitted to manager, which launches it using the activity's thread executor. 6) Job processes request targets by: expanding directories (if indicated); pre-storing discovered targets (if indicated); performing activity; processing completion as callback; storing and/or updating. 7) Consumer removes completed job from queue. 8) Consumer checks and updates state of requests. If clear is indicated, deletes request.



dCache Bulk Request Lifecycle

WLCG TAPE: A special case of the generic Bulk request

		BULK	WLCG TAPE
POST*	Pin	api/v1/bulk-requests	N/A
		{"activity":"PIN","arguments":{"lifetime":"1","lifetimeUnit": "DAYS","id":"<id>"},"target":["path",...]}	
POST*	Stage to disk	api/v1/bulk-requests	api/v1/tape/stage
		{"activity":"PIN","arguments":{"lifetime":"1","lifetimeUnit": "DAYS","id":"<id>"},"target":["path",...]}	{"files": ["diskLifetime":"P1D","path",...]} (*diskLifetime* is ISO 8601)
POST*	Unpin	api/v1/bulk-requests	N/A
		{"activity":"UNPIN","arguments":{"id":"<request_id>"}, "target": ["path",...]}	
POST	Release	api/v1/bulk-requests	api/v1/tape/release/<request_id>
		{"activity":"UNPIN","arguments":{"id":"<request_id>"}, "target": ["path",...]}	{"paths":["path",...]}
POST*	Change file QoS	api/v1/bulk-requests	N/A
		{"activity":"UPDATE_QOS","arguments":{"targetQos": "<new qos>"},"target":["path",...]}	
POST*	Delete	api/v1/bulk-requests	N/A
		{"activity":"DELETE","arguments":{"skipDirs":"<true/false>"}, "target":["path",...]}	

(*) The request id is returned with the response.


```
{
 "nextId": 2030215,
 "uid" : "0f8f4102-47f1-4b0a-aeda-e40280c2a769",
 "arrivedAt" : 1652712101542,
 "startedAt" : 1652712101551,
 "lastModified" : 1652712369571,
 "status" : "COMPLETED",
 "targets" : [ {
   "target" : "/pnfs/fs/usr/fermilab/users/arossi/tape/000/data-
20220509125616521189761113768 85",
   "state" : "COMPLETED",
   "submittedAt" : 1652712101670,
   "startedAt" : 1652712101670,
   "finishedAt" : 1652712101672,
}, {
 ...
]}
```

```
{
 "id" : "0f8f4102-47f1-4b0a-aeda-e40280c2a769",
 "createdAt" : 1652712101542,
 "startedAt" : 1652712101551,
 "completedAt" : 1652712369571,
 "files" : [ {
   "path" : "/pnfs/fs/usr/fermilab/users/arossi/tape/000/data-
20220509125616521189761113768 85",
   "finishedAt" : 1652712101672,
   "startedAt" : 1652712101670,
   "state" : "COMPLETED"
 }, {
 ...
]}
```


JSON GET responses, Bulk (PIN) request (left) vs WLCG TAPE stage request (right)

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