

# Creating a Grid Storage Element With S3-Compatible Object Storage at the University of Melbourne

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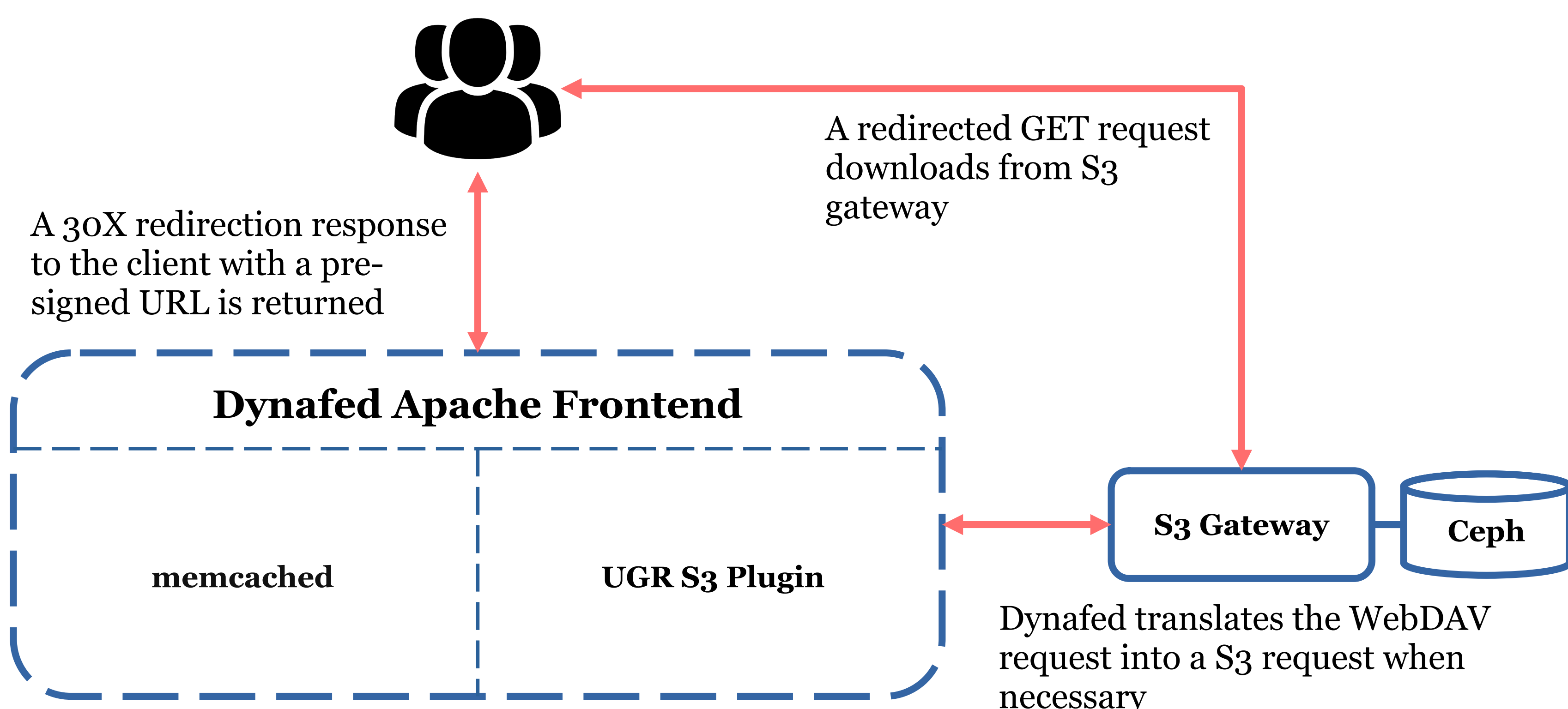
The grid storage at Melbourne's Tier-2 site was built using the DPM storage system, but both DPM and the disks are reaching EOL. Continuing to provide grid storage for the ATLAS and Belle II experiments requires that we move to a new solution; one that can be supported long term with our limited manpower by taking advantage of industry standard storage and tools.

At Melbourne the Research Computing Services (RCS) provides common resources across the university, including an OpenStack Melbourne Research Cloud (MRC) and a S3-compatible endpoint in front of a Ceph object store. Using experience from University of Victoria we have created a Dynamic Federation project (Dynafed) frontend server to provide a grid WebDAV interface to our S3 gateway.

## Dynafed

Part of the DPM project, Dynafed uses a collection of Apache 2 plugins and grid tools.

It serves HTTP redirection responses in order to federate different types of storage endpoints without directly serving the files itself.



X.509 certificates and VOMS are supported, with token-based authentication requiring some future development work. Checksums and third-party copy operations are implemented via plugin scripts.

## Monitoring

University of Victoria has a Logstash + Grafana monitoring setup that works with Dynafed to show statistics such as:

- Success/Failure of different request types
- Endpoint storage space
- Most commonly accessed files
- Server CPU usage



We use Elastic Beats to collect Apache 2 logs and storage space statistics which are then pushed to Victoria's Logstash server.

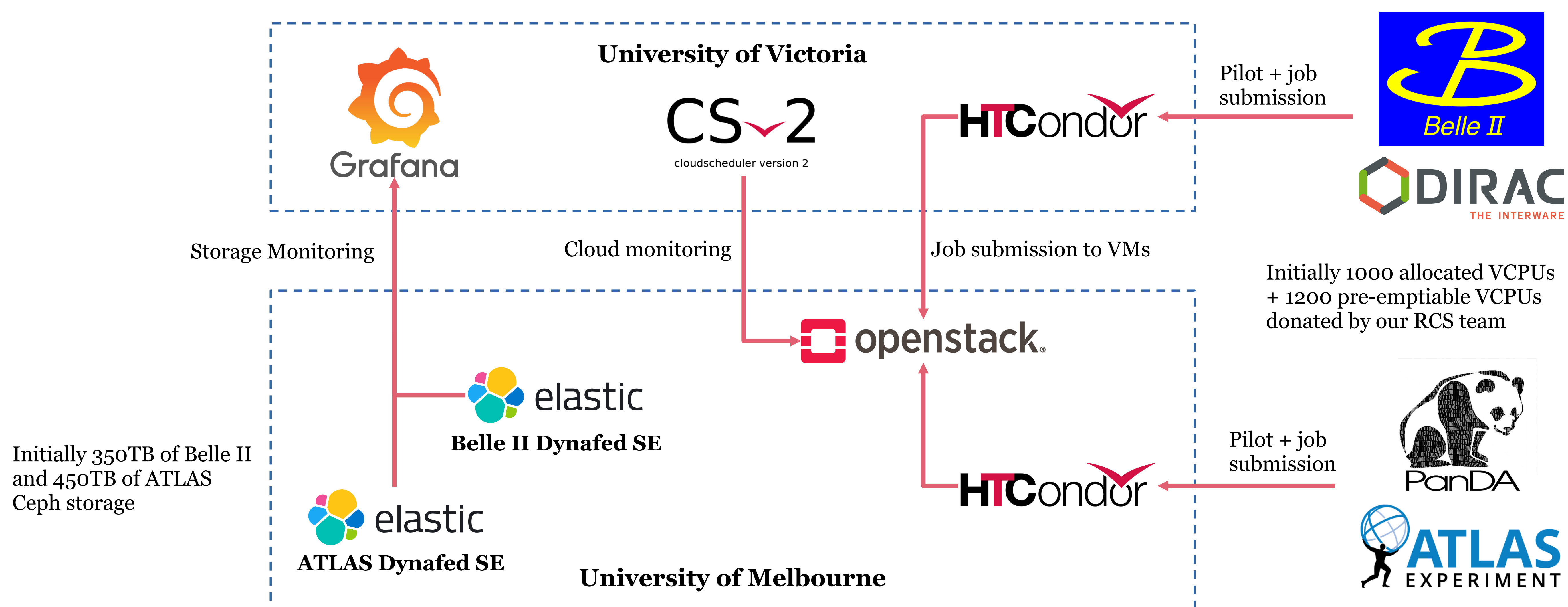
## Why Dynafed?

At Melbourne we don't have sufficient manpower or funding to build a site using preferred solutions like dCache, or a Ceph cluster that we run ourselves.

Instead we have taken advantage of our access to our centrally provided object storage and the corresponding expert support to maximise the grid resources we can purchase for the Belle II and ATLAS experiments.

Collaborating with University of Victoria has let us leverage their previous work and monitoring resources

## Planned Melbourne Tier-2 Site



## Current and Future Plans

- Final commissioning of the two Dynafed servers for ATLAS and Belle II
- Setting up the HTCondor instance at Melbourne in our OpenStack
- Help implement authentication tokens with Dynafed
- Help to keep Dynafed maintained beyond the DPM EOL in summer 2024
- Investigate the XRootD HTTP plugin to test if it would be a fallback solution for interacting with S3

