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# A technical summary of the new GovCMS

After an open approach to market completed in July 2018, the Department of Finance (Finance) has selected Salsa Digital to provide program, application and support services for the next iteration of GovCMS. amazee.io, as a subcontractor, will provide 24/7 platform and infrastructure support and maintenance services.

Salsa Digital is a digital agency, specialising in open source for open government, based in Collingwood, Victoria. amazee.io is a Drupal hosting specialist based in Switzerland, with staff around the globe, providing secure, high performance Drupal hosting solutions, managed by their open source hosting stack, Lagoon.

All GovCMS sites will still be hosted in Australia, running on Amazon's Sydney datacentres.

## Changes coming in the new hosting solution

The new hosting solution for GovCMS will be built on a full-stack open source, cloud-agnostic platform, complimenting the open source GovCMS Drupal 7 and Drupal 8 distributions. The platform will provide all the tools and environments for developing, testing, deploying, managing, supporting, and hosting GovCMS sites.

The new GovCMS integrates features such as containerisation, continuous integration (CI) and continuous delivery (CD) and brings the GovCMS SaaS and PaaS systems onto the same platform with a common development and deployment process. Agencies will be able to leverage upstream enhancements, benefit from economies of scale, and more automation. All sites, either SaaS (managed by Finance) or PaaS (self-managed by agencies), will be co-hosted on a single platform, but logically and securely isolated from each other.

Other changes to the GovCMS platform include the addition of elasticity and autoscaling, which uses metrics from the hosting environments to automatically increase or decrease the amount of resources needed to power the platform. This can be triggered by a momentary surge in traffic to a site (or several sites) and will automatically scale down once the spike is over. This feature also allows the platform to more efficiently allocate resources in periods of low activity, such as overnight, or at the weekend. Non-production environments will be configured to automatically conserve resources when not being used, instantly spinning up again on demand.

## New tools and components for GovCMS

The GovCMS platform will leverage a range of open source tools, as well as Drupal, including Docker, Lagoon, OpenShift (Kubernetes) and GitLab. Each of these tools has a strong community of existing users and developers that continue to evolve and extend their features. As GovCMS continues to evolve the contribution to the wider open source community will also continue.

### Docker (<https://www.docker.com/what-docker>)

Docker is an open source tool and the most commonly used implementation of containerisation. A container is a structure where any application can be stored, transported and run. It’s a way to package the application and its dependencies so it then becomes easy to install the application. Every container is created in seconds from a set of preconfigured images that have everything needed to run a Drupal site. To update an application, developers change the code in the container image(s), then redeploy the container to run on their chosen host.

### Lagoon (<https://lagoon.readthedocs.io/en/latest>)

Lagoon is an open source Docker build and deploy system (maintained by amazee.io) for OpenShift. It is the continuous delivery (CD) process that takes the project repository and converts it to a production artefact, which is then deployed to OpenShift.

Lagoon provides a range of GraphQL and REST APIs for the management of projects, post-deployment tasks, scheduling, and access control, as well as traditional developer tools like SSH, and a command line interface (CLI) that fully supports Drush.

Developers will be able to build and deploy their sites using a wide range of Lagoon's platform-optimised components such as preconfigured base images for Nginx, PHP, MariaDB, Redis, Solr, Elasticsearch, and Varnish.

Developers will also be able to locally develop their GovCMS sites with Docker and run the exact same system in production, using the same Docker images, the same service configurations and the same code. Lagoon manages the conversion of a “local” Docker project into a production-ready artefact by passing it to the OpenShift application.

### OpenShift (<https://www.openshift.com/learn/what-is-openshift>)

OpenShift is a security-focussed open source container application platform based on top of Docker containers, and is a tool to automate the build, deployment, and management of enterprise applications on Kubernetes. The OpenShift Container Platform is supported and maintained by RedHat, providing stability for version upgrades as well as managing any security patches.

### Kubernetes (<https://kubernetes.io>)

Kubernetes is an open source orchestration system, originally created by Google, for automating the deployment, scaling, and management of containerized applications, eliminating many of the manual processes involved in running at scale.

Kubernetes will automatically resolve issues with any container, site or availability zone. Self-healing capabilities ensure automated recovery of individual sites, or in the most extreme case, entire physical data centres (availability zones).

### GitLab (<https://about.gitlab.com>)

GitLab is an open source Git repository manager with issue management, version control, code review, monitoring, CI and CD. GitLab's included continuous integration and continuous deployment tools automate the merging of changes and updates to code, and to start the process to deploy those changes into the online environments.

GitLab will also be used to manage the distribution release and patch process – allowing precise control over the availability of GovCMS releases, and the ability to create on-demand test environments for agencies to test upcoming features and releases.

### Monitoring and logging tools

The GovCMS platform will use a range of enterprise ready open source tools to monitor the platform. Elasticsearch will store all logs generated by the platform, Logstash and Kibana to process and interrogate log files. Additional tools such as Prometheus and Grafana will also be used to track the performance of the platform, and to create digital system dashboards.

### AWS - Amazon Web Services

The OpenShift cluster will be hosted in Amazon's Sydney AWS region. By default, all SaaS websites hosted by GovCMS will use a highly available configuration split between 3 availability zones. PaaS websites will also be able to opt in for the highly available configuration.

Amazon storage services such as EBS, EFS, S3 and Glacier will be used to manage short, medium and long-term storage of data, site and platform backups. Amazon's Virtual Private Cloud (VPC) will provide a network-level separation between GovCMS and other users, and AWS Shield Advanced will be used to provide all sites with additional safeguards against large and sophisticated DDoS attacks.

### New processes and iterative improvements

As we deploy the new GovCMS platform, continuous improvement and optimisation of the platform will be a priority. Finance will work collaboratively with Salsa Digital and amazee.io, tuning resource allocation, optimising content caching strategies and using the monitoring, logging and reporting tools to understand every aspect of the platform and its performance.

Configuration of deployment workflows, the provision of easy-to-understand audit checkpoints and a range of automation enhancements such as automated regression testing will make it easier for agencies to develop, manage and enhance their websites. Finance is also exploring opportunities to embed automated visual regression and accessibility testing in the site deployment workflow.

Another enhancement planned for GovCMS customers will be a new service and support desk tool. The GovCMS service desk will also use Amazon AWS for hosting, in an Australian datacentre.

## Drupal 8 on GovCMS SaaS

Finance is working on the Drupal 8 version of the GovCMS distribution. When available on the platform later in 2018, agencies will be able to have Drupal 8 sites on fully-managed SaaS hosting plans for the first time. Drupal 8's enhanced standard feature set, along with an improved out-of-the-box theme and site building experience, will continue to reduce the technical barriers for agencies building sites on GovCMS.

GovCMS will continue to support Drupal 7, and will be making the necessary enhancements to ensure that the current distribution is fully PHP7 compatible by October 2018.

## GovCMS SaaS and PaaS Security Roadmap

Work is already underway on the preparation of the necessary documentation required for IRAP certification. GovCMS is going to take a two-stage approach, accrediting the whole platform (both SaaS and PaaS) to UNCLASSIFIED initially, but with a clear roadmap to achieving an UNCLASSIFIED-DLM rating in early 2019.