

All About Runners

GDS Central | 13 February 2023

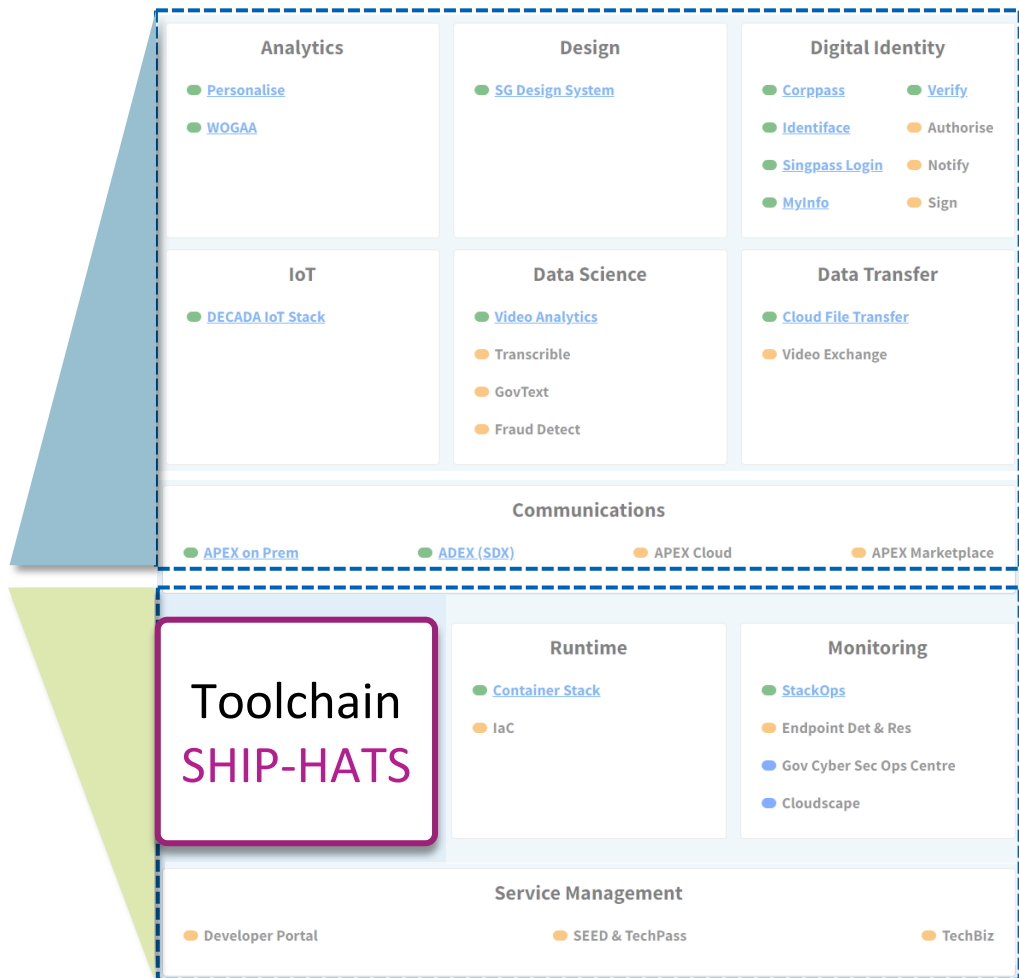
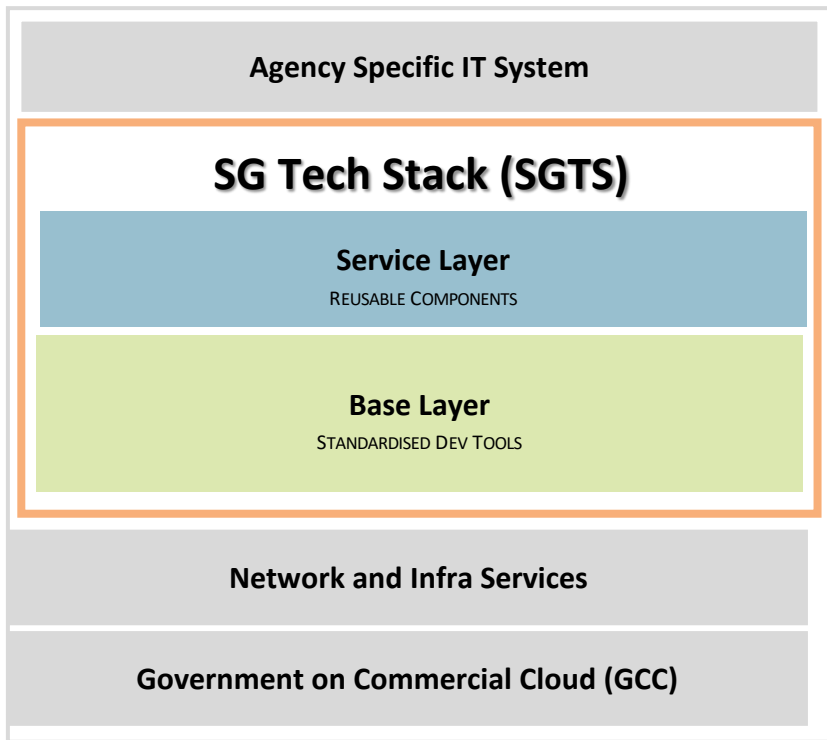


Agenda

- Recap: SHIP-HATS 2.0. Goals and Offerings
- Introduction To Runners
- Types of Runners
- Runner architecture
 - How to manage self-hosted runners
 - DevOps zone architecture in GCC 2.0
 - How to configure runners for deployment to GCC etc.
- Which shared runner should I use
- Recommended Approach

Stack – Government-in-a-Box

www.developer.tech.gov.sg



Recap: SHIP-HATS 2.0 Goals



1. Faster time to market

- One DevOps Platform
- End-to-End Source Code Management & CI/CD



2. Greater Transparency

- Pre-Defined Industry DevOps Metrics and Dashboards, incl DORA
- Value Stream Measurement Capabilities



3. Built-In Security

- Compliance Pipelines
- Integrated Security Testing

Tools Recap

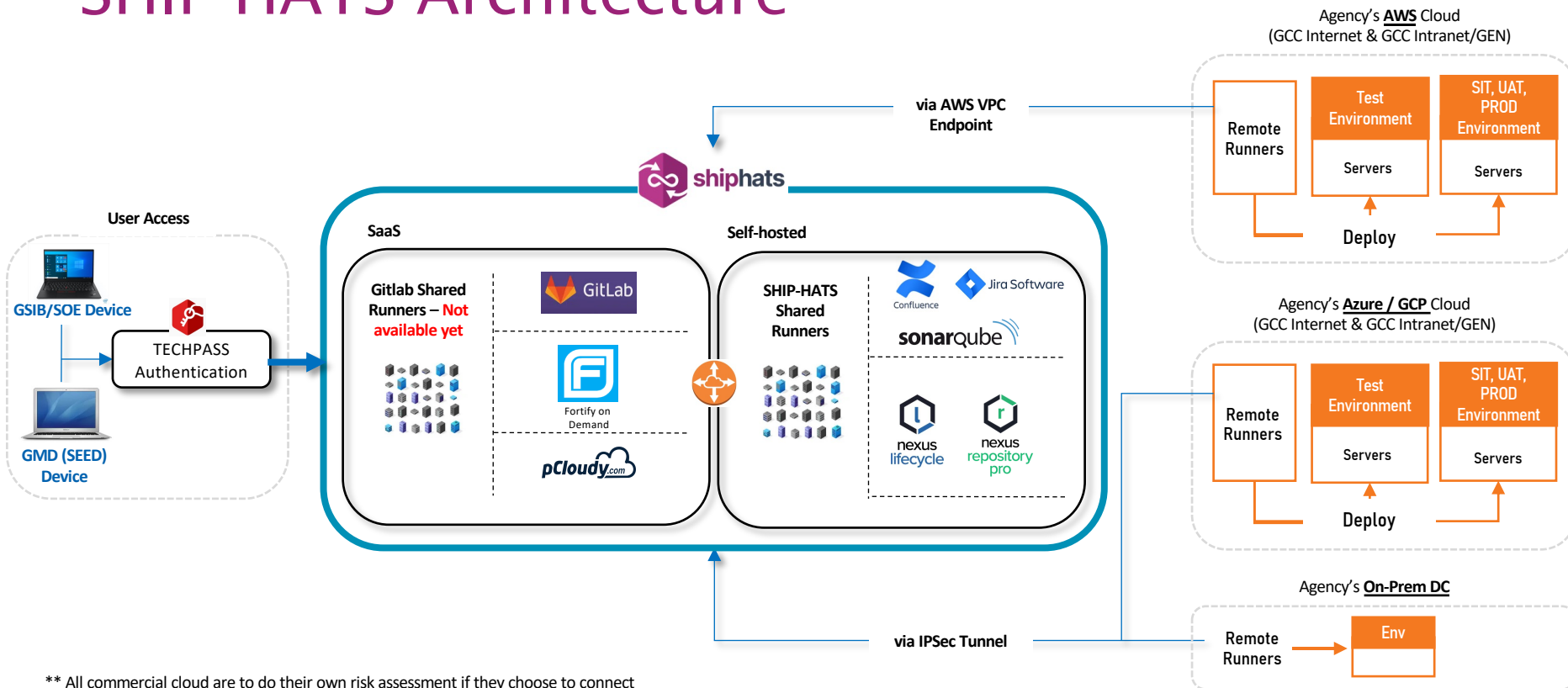
	SHIP-HATS 2.0*	
STAGE	GitLab Native	Alternative Tool
ACCESS	TechPass & SEED	
PLANNING	GitLab Issues/Wiki	Jira, Confluence
BUILD	GitLab CI/CD	NA
	GitLab Package Registry	Nexus Repo
	GitLab Dependency Scanning	Nexus Intelligence
BUILD TESTING	GitLab SAST	Fortify-on-Demand ^{new!}
OTHER TESTS	GitLab Code Quality Scanning Tool	SonarQube Developer Edition (On-Prem)
	GitLab DAST	Fortify-on-demand ^{new!}
	GitLab Container Scanning	NA
	NA	pCloudy Test Farm
DEPLOY & RELEASE	GitLab CI/CD	NA

SHIP-HATS 2.0 GitLab



- ✓ SHIP-HATS 2.0. is on **GitLab Dedicated**
- ✓ A SaaS instance managed GitLab
- ✓ Hosted in Singapore by GitLab
- ✓ Licenses are at the “Ultimate” tier - highest offering provided by GitLab which comes with advanced features including value stream measures and dashboards

SHIP-HATS Architecture



** All commercial cloud are to do their own risk assessment if they choose to connect remote runners to SHIP-HATS Gitlab over the internet.

RUNNERS 101

What:

- ✓ Runners **run** the CI/CD pipelines. (~Bamboo Agent)
- ✓ Pipeline **jobs** are assigned to available Runners
- ✓ Runners **execute the work** you defined in your GitLab pipeline jobs.

How:

- ✓ Runners can be installed on your local machine, VM, Docker container or any cloud infrastructure.
- ✓ Supported on Linux, Windows, MacOS, FreeBSD

GitLab Runner Executor **New!**

Determines the environment in which a job will run:

- VM via a hypervisor such as VirtualBox
- Shell
- Remote SSH
- Docker
- Kubernetes
- Custom executor

RUNNERS 101

GITLAB RUNNER

EXECUTOR

RUNNERS 101

GITLAB TAGS

GitLab Tags ^{New!}

- ✓ Tags are configured on the GitLab Runner
- ✓ **Reference tags** in a GitLab pipeline **specify which runners should be used for the job.**

```
app-deploy:  
  stage: deploy  
  tags:  
    - kubernetes
```

SHIP-HATS Runners



Runner Options

Option 1: SHIP-HATS Shared Runners

- Hosted by SHIP-HATS team
- Created on-demand
- Available for all SHIP-HATS users at no additional costs!
- No overheads for Agencies to maintain runners.
- 4 variants: **CStack**, **Docker**, **Windows** and GitLab Shared Runners

Option 2: Self-hosted Remote Runners

- Hosted by the agency
- Agencies to bear the costs of hosting their own runners
- Can be configured for Group or Project level access
- Full-control of the runners

Option 1: SHIP-HATS Shared Runners



SHIP-HATS Shared Runners

Pipeline Template list & links available on Developer Portal

Runner Variant	Description
CStack Runner	<ul style="list-style-type: none">• We recommend using this runner by default• Run as non-root• Uses Container Stack in SGTS
Docker Runner	<ul style="list-style-type: none">• To build a docker image• Run as root• Is slower than CStack Runner for use cases that can run both runners• Use Kaniko as a docker alternative. <p>Modular template available on developer portal!</p>

🔗 File: [.gitlab-ci-docker-build.yml](#)

Template: `.build-and-push-docker-image`

Target user:

This template allows users to do build and push docker image to private registry in one single action which is defined in the "script" key.

Add on implementation should go in:

- `before_script`
- `after_script`

See example/s:

- Container-Signing: [Sample usage code](#) and [Documentation](#)
- [supporting-apps/simple-docker-image](#)
- Readiness-Check-For-Docker-Service: [Sample usage code](#) and [Documentation](#)
- [supporting-apps/simple-docker-app](#)

Variable/s to set:

SHIP-HATS Shared Runners

Libraries List available on Developer Portal

Runner Variant

Description

Windows Runner

- For .Net framework
- List of Binaries include OS: MS Windows Server 2019 Base, Git: 2.36.1, Visual Studio 2022 version 17.0, .Net framework 4.8 development tools. And more!
- Notes: there is a clean up job required at the beginning.

GitLab Shared Runner on SaaS

Not available yet!

Component	Path
JAVA_HOME	C:\Program Files\OpenJDK\openjdk-11.0.15_10
Git	C:\Program Files\Git
MSBuild17_PATH	C:\Program Files\Microsoft Visual Studio\2022\BuildTools\MSBuild\Current\Bin
MSBuild16_PATH	C:\Program Files (x86)\Microsoft Visual Studio\2019\BuildTools\MSBuild\Current\bin
MSBuild15_PATH	C:\Program Files (x86)\Microsoft Visual Studio\2017\BuildTools\MSBuild\Current\bin
.NET SDK	C:\Windows\Microsoft.NET\Framework64\v4.0.30319 - v4 (64 bit)
	C:\Windows\Microsoft.NET\Framework\v4.0.30319 -v4 (32 bit)
AppDeployment Toolkit	C:\PADT\Toolkit
VS2017_TEST_PATH	C:\Program Files (x86)\Microsoft Visual Studio\2017\TestAgent\Common7\IDE\CommonExtensions\Microsoft\TestWindow
VS2019_TEST_PATH	C:\Program Files (x86)\Microsoft Visual Studio\2019\TestAgent\Common7\IDE\CommonExtensions\Microsoft\TestWindow
VS2022_TEST_PATH	C:\Program Files (x86)\Microsoft Visual Studio\2017\TestAgent\Common7\IDE\CommonExtensions\Microsoft\TestWindow
Microsoft VS Code	C:\Program Files\Microsoft VS Code

SHIP-HATS Shared Runners

Runner Variant	Executor	Privileged	Tags	Cache Enabled	Run Untag
CStack Runner	kubernetes	FALSE	cstack non_privileged no_root	YES	YES
Docker Runner	docker+machine	FALSE	ship_docker non_privileged	YES	NO
Windows Runner	shell	N/A	ship_windows	YES	NO

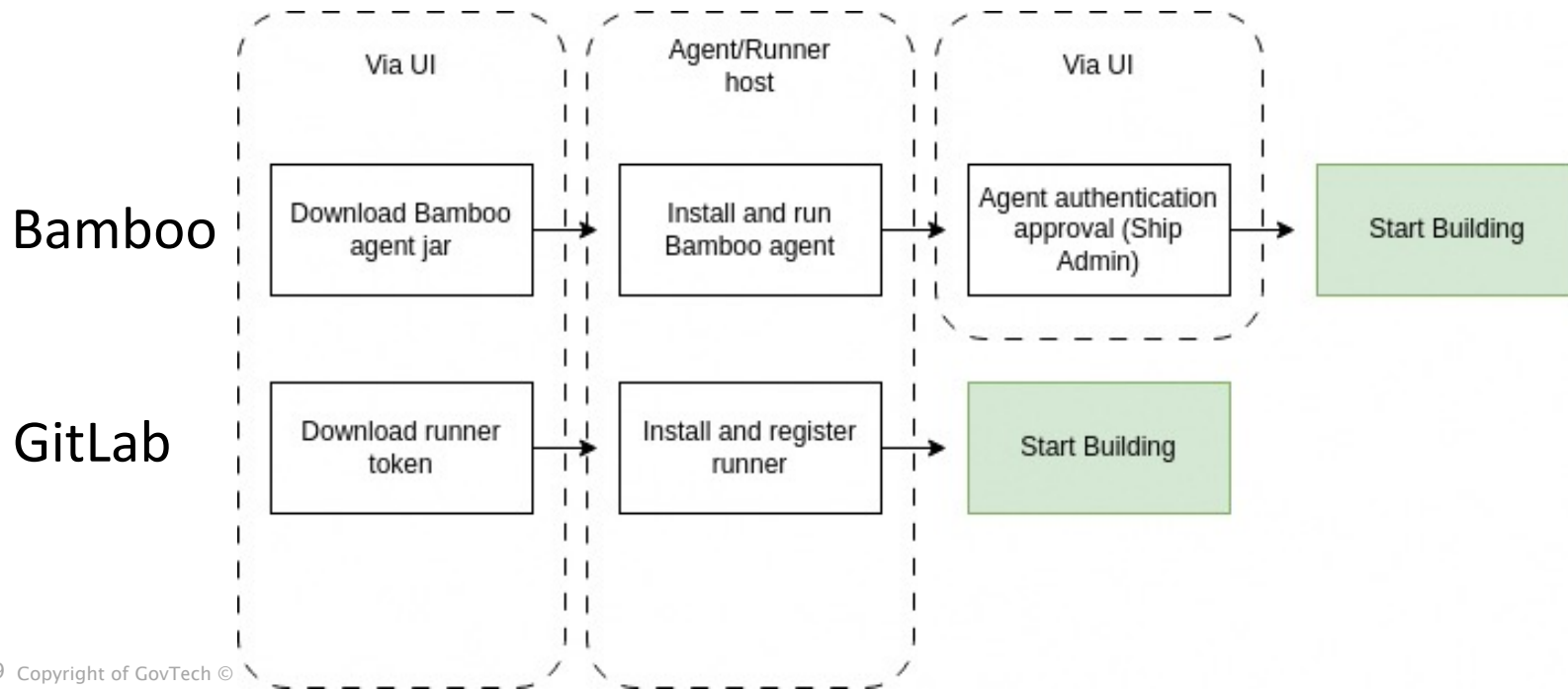
Option 2: Self-hosted Remote Runners



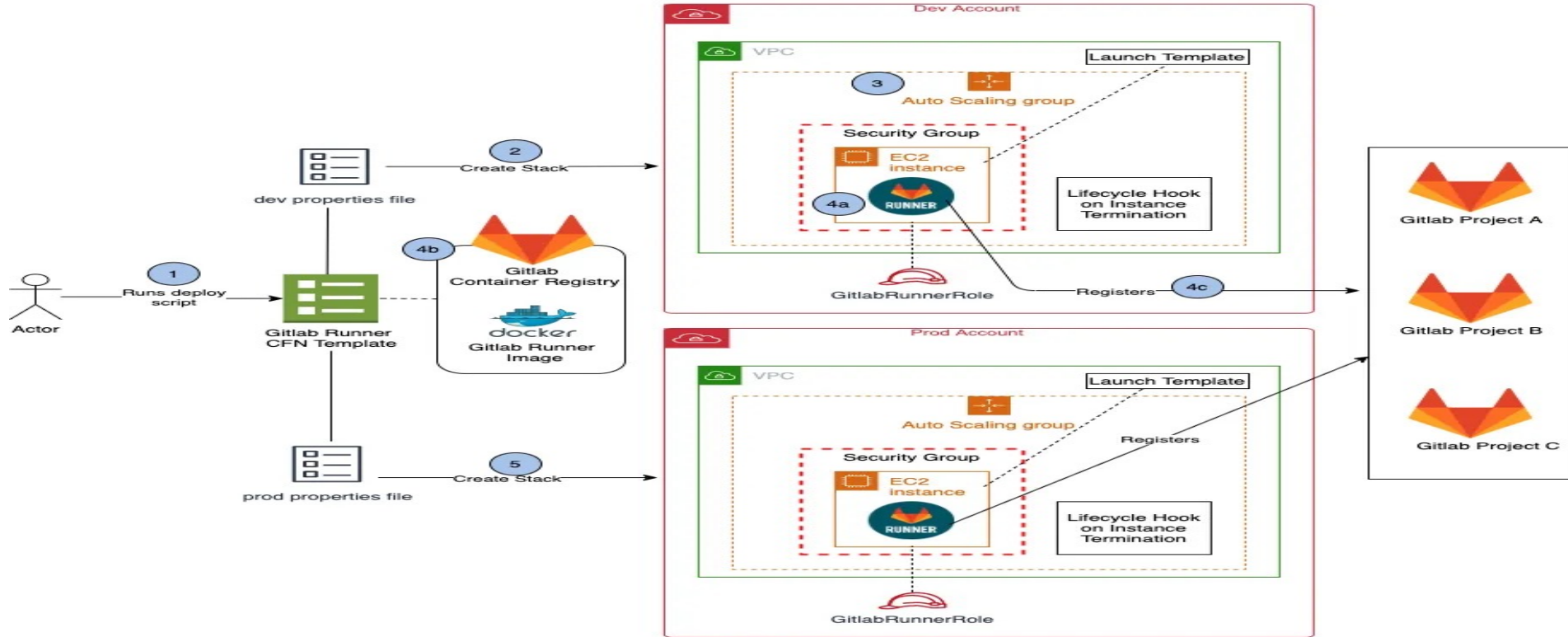
Runner Registration

- Group or Project owner/maintainer can obtain runner token through the UI.
- Registered runner has access to the project code
 - Review properly when granting group/project level permission.

Remote Bamboo Agent vs Remote Gitlab Runner Registration

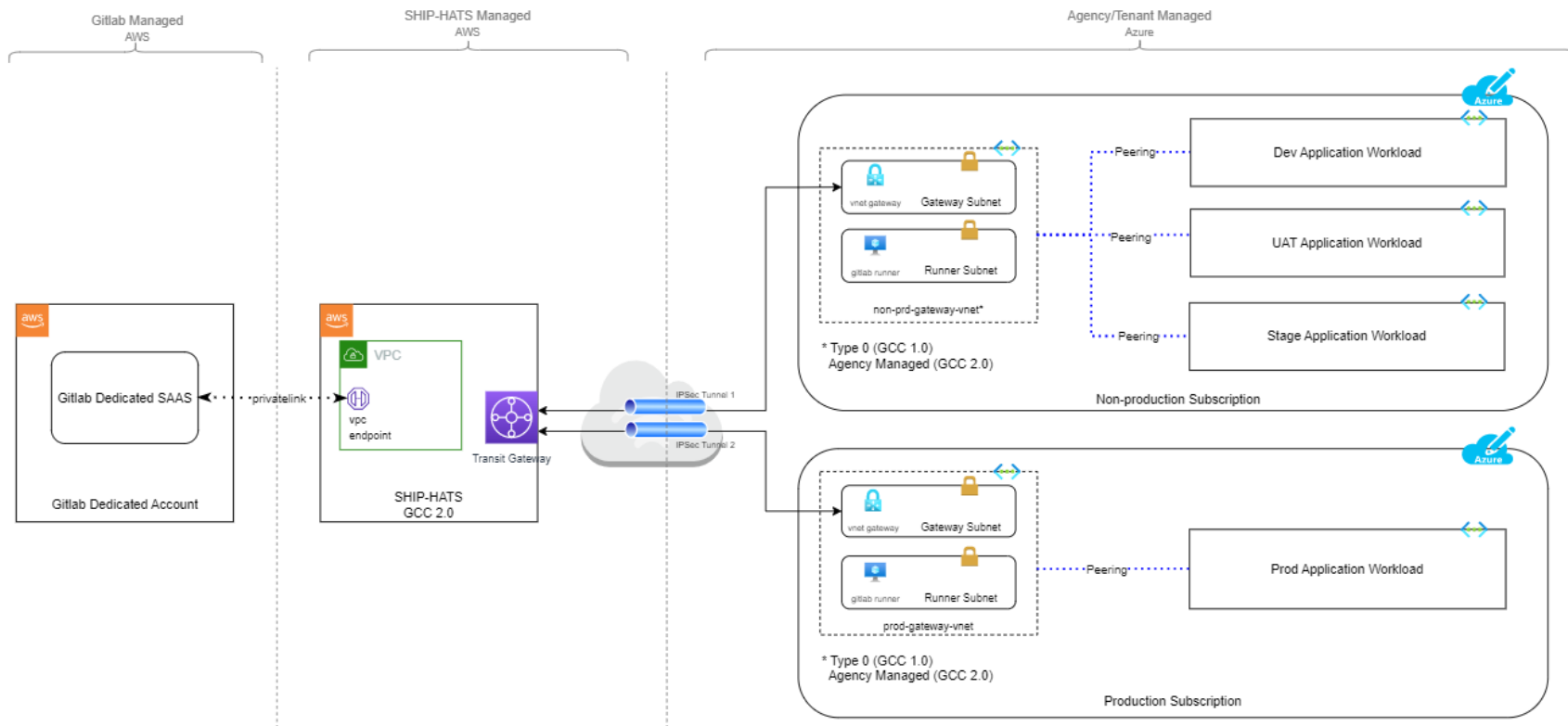


Remote Runner Architecture

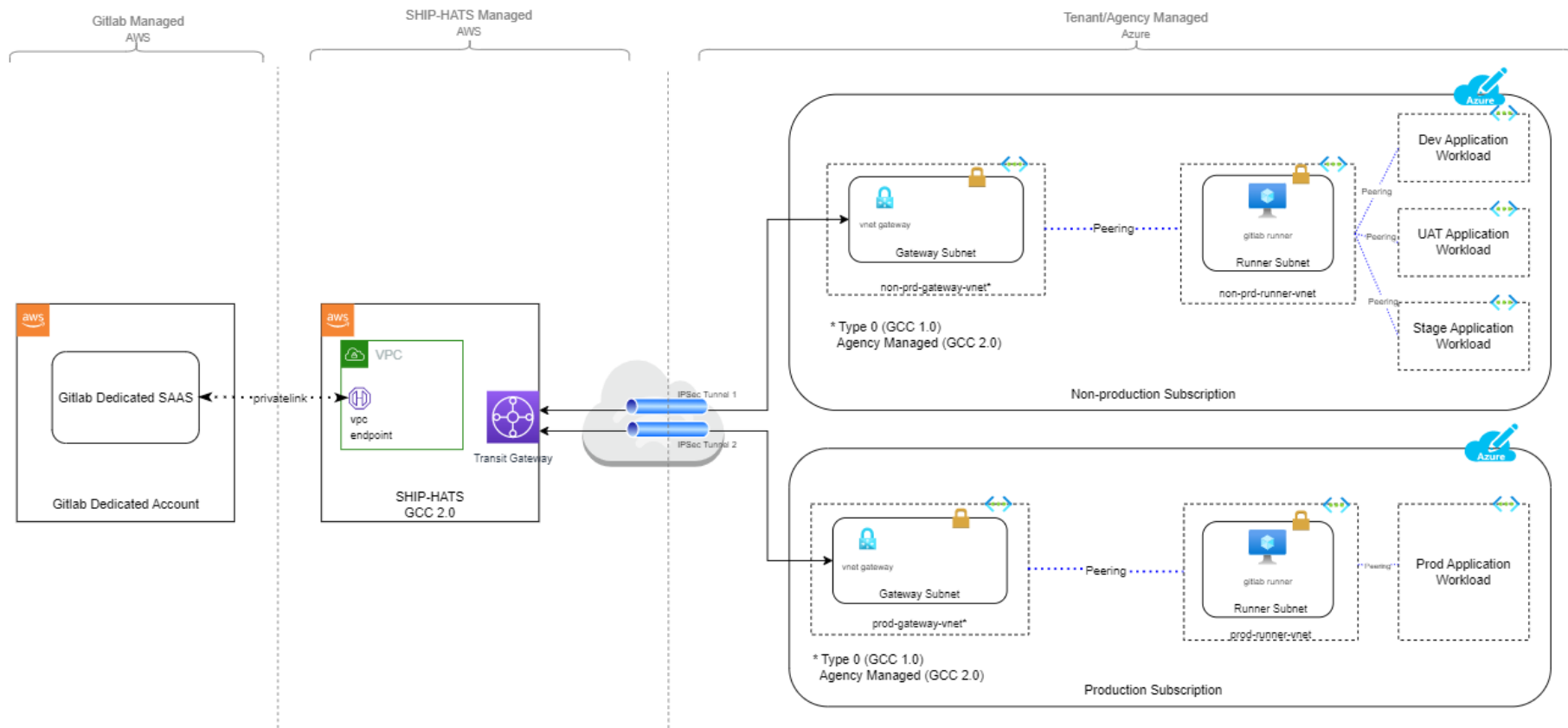


<https://aws.amazon.com/blogs/devops/deploy-and-manage-gitlab-runners-on-amazon-ec2/>

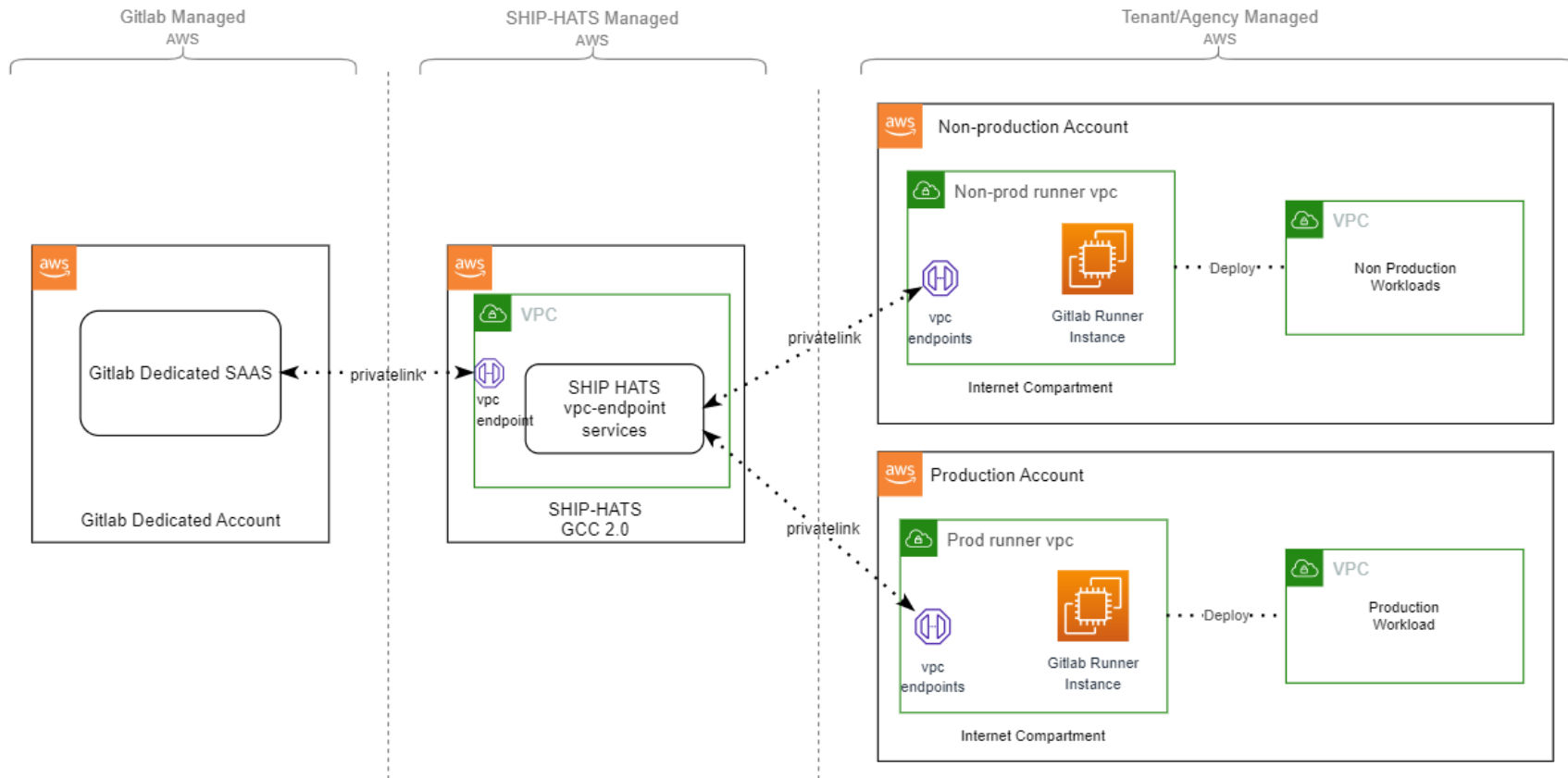
Azure 1



Azure 2



AWS 1



Remote Runner Architecture

- Determine what tasks your self-hosted runner is running
 - CI runner, CD runner, or CICD runner
- CI runner
 - Internet compartment
- CD runner
 - Access to your application
- CICD runner
 - Both of the above apply
- **Runner Specs**
 - t3-medium
 - Start small and adjust to your future needs.

GitLab Runner Monitoring

- The GitLab runner has embedded Prometheus metrics HTTP server for monitoring.
 - Runner business logic metrics (current running jobs?)
 - Go-specific process metrics (garbage collection, memory stats)
 - General process metrics (memory, CPU utilization)
 - Build version information

<https://docs.gitlab.com/runner/monitoring/>

CHANGES FOR SHIP-HATS 2.0

- No approval
 - self-help (runner register)
- Fair Usage policy
 - Max 10 project in personal namespace
 - Regular housekeep
- Global settings
 - 300 jobs a single pipeline
 - 50 active pipeline per project
 - Max 100 registered runners

Recommended Approach

- SHIP-HATS Shared Runners is highly recommended
- Remote runner for what we don't support (example iOS)
- Unlike Bamboo, in GitLab, there is a more robust runner mechanism with sufficient runners to support parallel jobs
- Therefore, to save costs, agencies should consider using the SHIP-HATS Shared Runners except for highly urgent projects that require dedicated

Reminder: Key Tool Decommission Dates

Tools	Decommission Date	Replacement
OpenVPN	31 December 2022	TechPass/Seed
Digital.ai	31 May 2023	GitLab
Fortify WebInspect (OnPrem) Fortify SCA (OnPrem)	31 July 2023	GitLab SAST/DAST or Fortify On Demand
Bitbucket/ Bamboo	Jan 2024	GitLab

Have more
questions?

- Reach out to us at
<https://go.gov.sg/she>
- Technical documentation
<https://go.gov.sg/ship-hats-docs>

Thank You

