

GSoC WLCG: SIMPLE Grid Python Components

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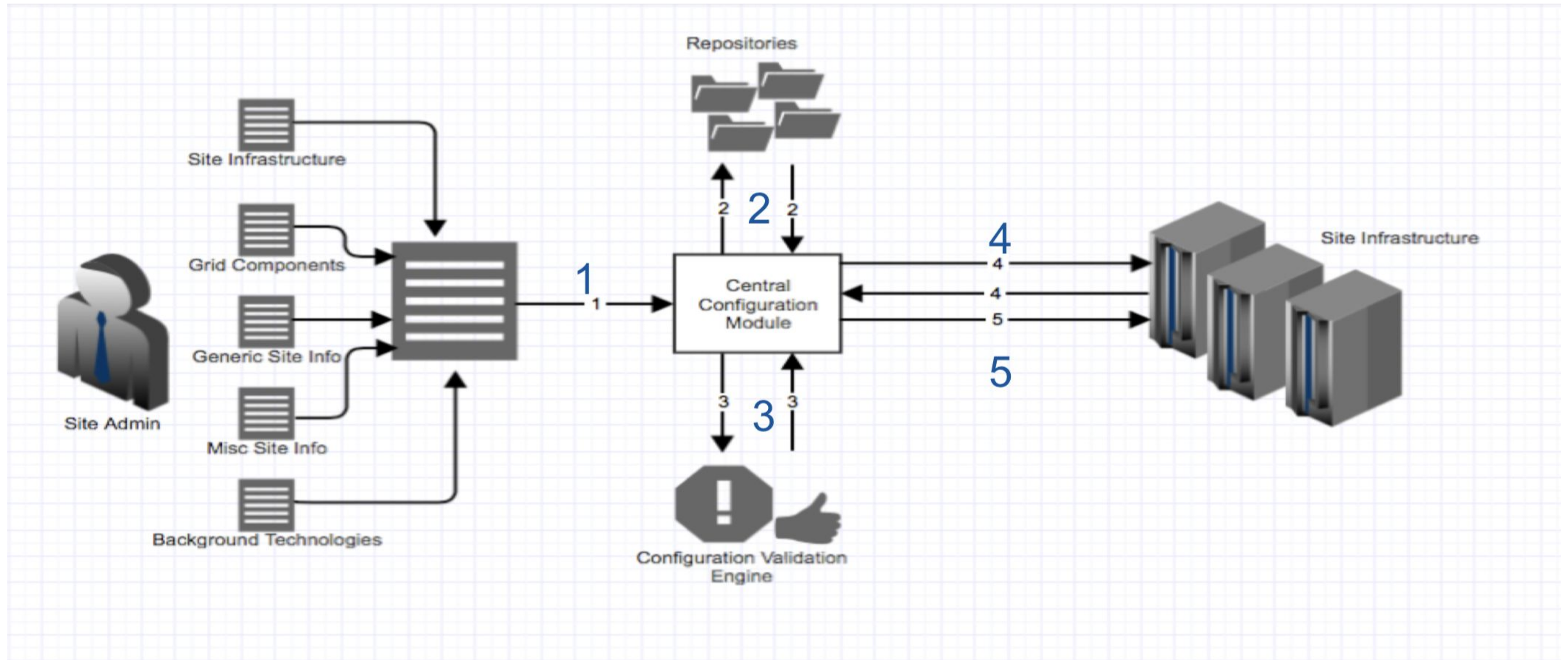
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Introduction

A brief overview:

- The WLCG (Worldwide LHC Computing Grid) project provides computing resources to store, distribute and analyse hundreds of PB of data.
- SIMPLE Framework: Solution for **Installation**, **Management** and **Provisioning** of Lightweight Elements.
- The [SIMPLE Grid framework](#) is an extension of the SIMPLE framework to help WLCG site admins deploy WLCG services more easily.
- Two of its core components are written in Python: the YAML Compiler and the Validation Engine.

SIMPLE Grid - Flow



The Compiler

The SIMPLE Grid YAML Compiler takes configuration file prepared by a site admin along with base files like [simple-base-schema](#), [simple-base-defaults](#) and [simple-base-meta-info](#) and augments them into a single configuration file suitable for deploying the site infrastructure.

Phases:

- Add required runtime variables and global variables
- Recursive checking of nested schemas
- Place defaults for missing configuration values
- Generates schema to aid validation of site config file

Value Specified	Required	Use-Default	Output
F	F	F	Ignore
F	F	T	Default Value
F	T	F	Error
F	T	T	Default Value
T	F	F	Specified Value
T	F	T	Specified Value
T	T	F	Specified Value
T	T	T	Specified Value

Config Validation and Infra Validation

Configuration validation:

- Builds on top of [Yamale](#)
- Config Validation Engine ensures information supplied in site config file:
 - Meets configuration requirements of desired site component
 - Custom validation injected to test specific use cases

Infra validation:

- [Testinfra](#) validates actions of Central Configuration Manager at every stage of execution pipeline
- After the site config has been deployed, Infra validation tests to check status of available Site Infrastructure that needs to be orchestrated

My contributions

Links to my contributions:

- [Simple Grid YAML Compiler](#)
- [WLCG Configuration Validation Engine](#)
- [Simple Grid Infra Validation Engine](#)
- My tasks are also documented in these boards: [Sprint 1](#), [Sprint 2](#) and [Sprint 3](#)

Outcome

The code contributed by me is a part of the [v1.0.0 release](#) of the framework and is already being used at the first WLCG site involved in the project.

- Practiced and implemented better code quality principles like modularity, abstraction and DRY in the code base.
- Added a new phase in the compiler and worked on recursive checks for nested schemas.
- Continuously improved processing of input configuration schema by the compiler and wrote custom validators and tests for several aspects.
- Worked with multiple technologies in Container Orchestration (Docker, Swarm), Configuration management (Puppet) and regular development (Python, Yamale).

I hope my contributions aid the work of people working on WLCG framework in the future as well.

Thank You!