

Multi-site Cluster Reservation for PRAGMA cloud

Visaruth Punnium¹, Pasit Pongpojkasem¹

Shava Smellen², Nadya Williams², Prapaporn Rattanatamrong¹

[1] Thammasat University, Thailand, [2] University of California, San Diego.

Motivation

The development of the PRAGMA booking to enable additional features in supporting requests for a cloud cluster created using resources from more than one site (called a multi-site cluster) is essential because

- resources in one site may not be enough for processing applications that require a large amount of computing or use a lot of memory.
- Some studies/experiments require suitable environments where resources are distributed among multiple sites and data must be sent between sites.

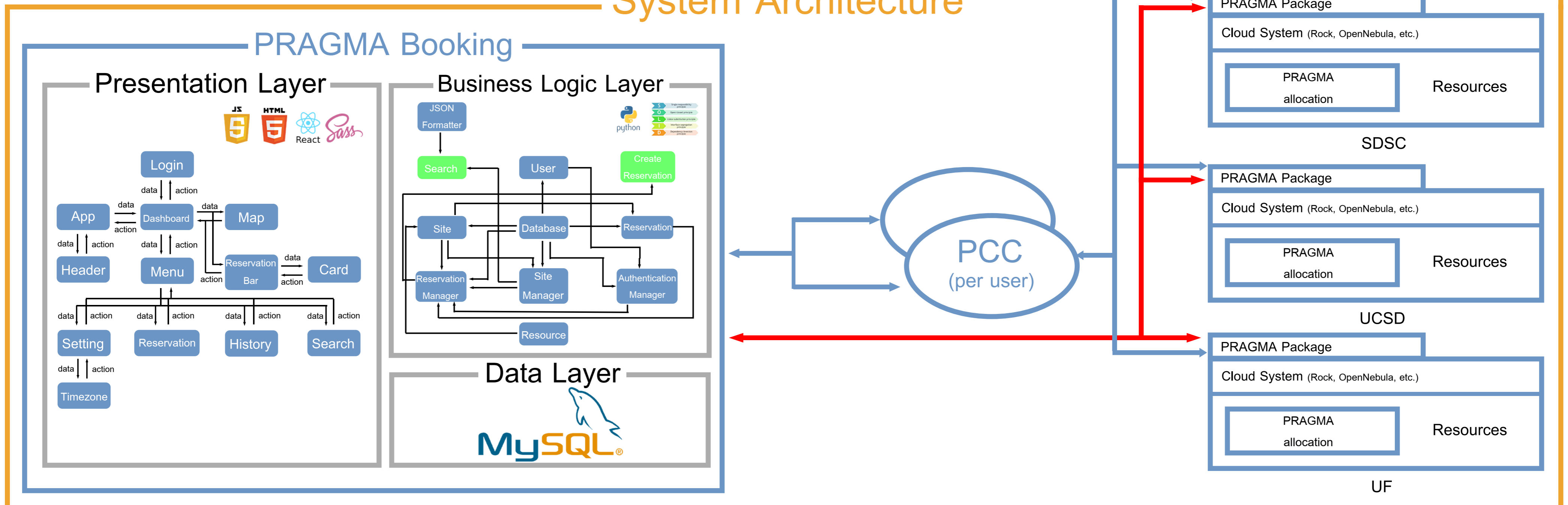
The challenges of designing and supporting multi-site cloud clusters are the followings:

- The compatibility of resources from different sites, both in network technologies and image types, for nodes to function properly in the same cluster.
- Allocation of resources from each site within the same cluster has to be consistent with system restrictions and, at the same time, satisfies user requirements.
- Displaying useful additional information can facilitate users in decision making but must be done without causing confusion to users and avoiding any user errors.
- New features must function effectively with other existing components of the PRAGMA cloud scheduler.

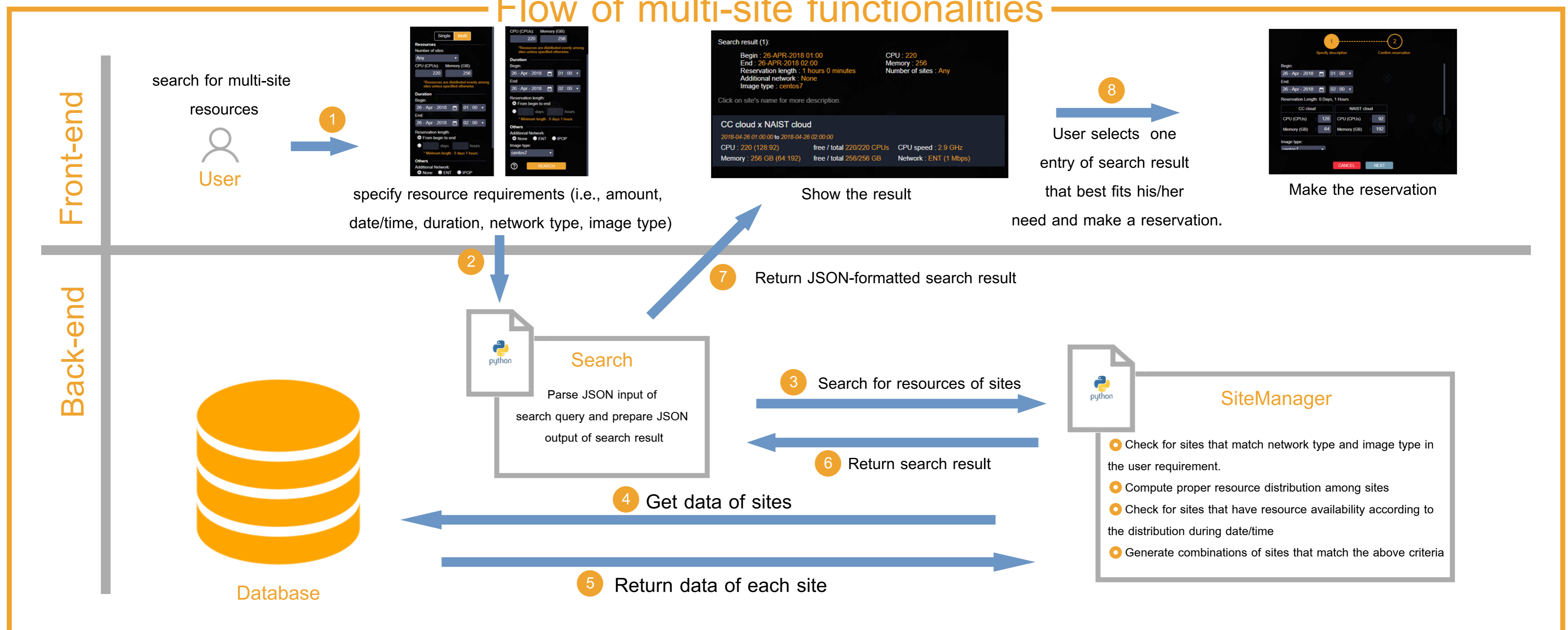
Objective

The main objective of this project is to develop an updated version of the PRAGMA booking that will support searching and reserving resources on multiple sites to create a multi-site cluster.

System Architecture



Flow of multi-site functionalities



Summary

- Develop the PRAGMA Booking system to support multi-site cloud clusters in order to solve the insufficient resources problem for processing applications that require a lot of calculation.
- Allow modification of the single-site and multi-site resource reservations (Not yet activated).
- Add details about each site's resources (e.g. processor and network speed), to assist users in making decisions.

References

Smellen S, Williams N, Papadopoulos P. Lightweight scheduling for the PRAGMA cloud testbed. Concurrency Computat: Pract. Exper. 2017;29:e4132. <https://doi.org/10.1002/cpe.4132>

Kaewlamul P, Banluesombatkul N, Rattanatamrong P, Williams N, Smellen S. PRAGMA Cloud Scheduler: Improving Usability of the PRAGMA Cloud Testbed. 2017 International Computer Science and Engineering Conference (ICSEC), Bangkok, Nov 2017.