

# Secure Cloud-Based Workflow-as-a-Service (WFaaS) Environment with Role-Based-Access-Control (RBAC) for SoC Design

Sai Manoj P.D.<sup>1</sup>, Hao Yu,<sup>1</sup> and Joseph Lee<sup>2</sup>

<sup>1</sup>School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore

<sup>2</sup>Silicon Cloud International, Singapore.

**Email:** [saimanoj002@e.ntu.edu.sg](mailto:saimanoj002@e.ntu.edu.sg), [haoyu@ntu.edu.sg](mailto:haoyu@ntu.edu.sg), [joseph.lee@siliconcloudinternational.com](mailto:joseph.lee@siliconcloudinternational.com)

During the DATE Conference, NTU and Silicon Cloud International (SCI) will demonstrate a next generation semiconductor design infrastructure with a private cloud computing Design-To-Release-Manufacturing (**DTRM**) SoC design workflow for universities and research institutions. This demonstration will give a “first look” view of the SoC design workflows using RTL simulation, digital place & route, analog circuit simulation within a self-contained, fully virtualized cloud computing infrastructure as part of a constrained SoC design reference workflow that can be used for university research and academic training curriculum.

All design data is maintained securely in the cloud. This private cloud-based system provides a secure, collaborative, and effective inter-organizational Role-Based-Access-Control (**RBAC**) working environment. Secure cloud-maintained third party semiconductor IP catalogs can be browsed, evaluated, and then selected for immediate project inclusion.

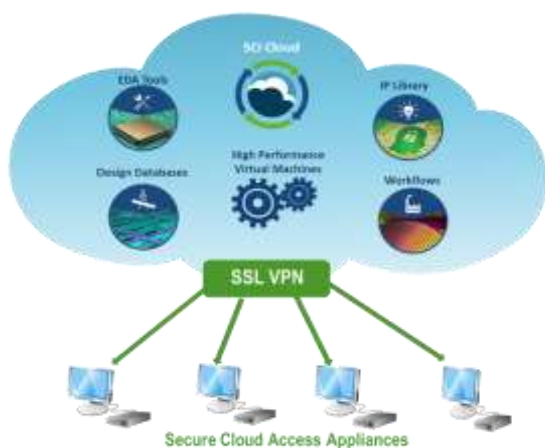


Figure 1: SCI Cloud Infrastructure Overview

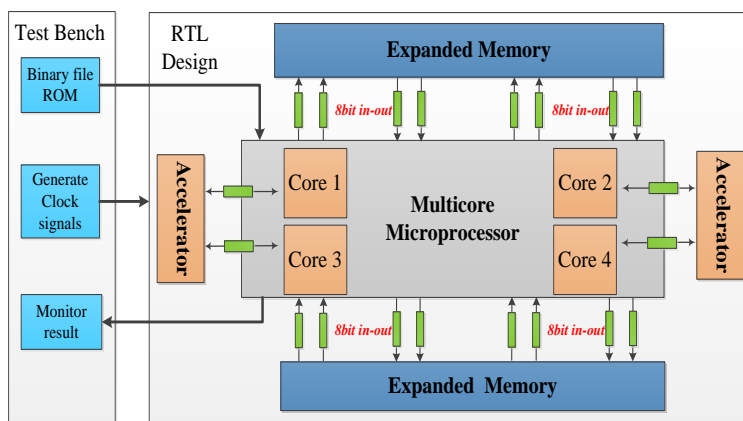


Figure 2: Simulation Model of a multi-core SoC Design

- Workflows can be defined, developed, catalogued, and securely provisioned through SCI’s cloud based workflow database and visualization software.
- EDA tools can be examined, selected, and executed within the context of a constrained, qualified silicon foundry reference workflows.
- Semiconductor IP can be imported, registered, staged, and catalogued for private use.
- Workflow provenance extends across users, projects, organizations, and IP’s. It also provides tracking and checking for workflow compliance and tape out requirement.
- Cloud user access controlled by an integrated secure Role-Based-Access-Control (**RBAC**) model

All EDA software application execution is performance-driven with respect to computing, memory, and networking. The SCI cloud is based on Virtual Machine (VM) configurations with a private cloud computing converged architecture using OpenStack cloud middleware running on Cisco Systems’ Unified Computing System (**UCS**) computing platform. The SCI Cloud provides VM configurations tailored to the High Performance Computing (HPC) requirement that are foundational to large semiconductor SoC design.