Modular Security Analysis of OpenStack

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What is OpenStack?

- Open source, widely used, IaaS cloud computing platform
- Highly modular: consists of several modules some of which take many plugins
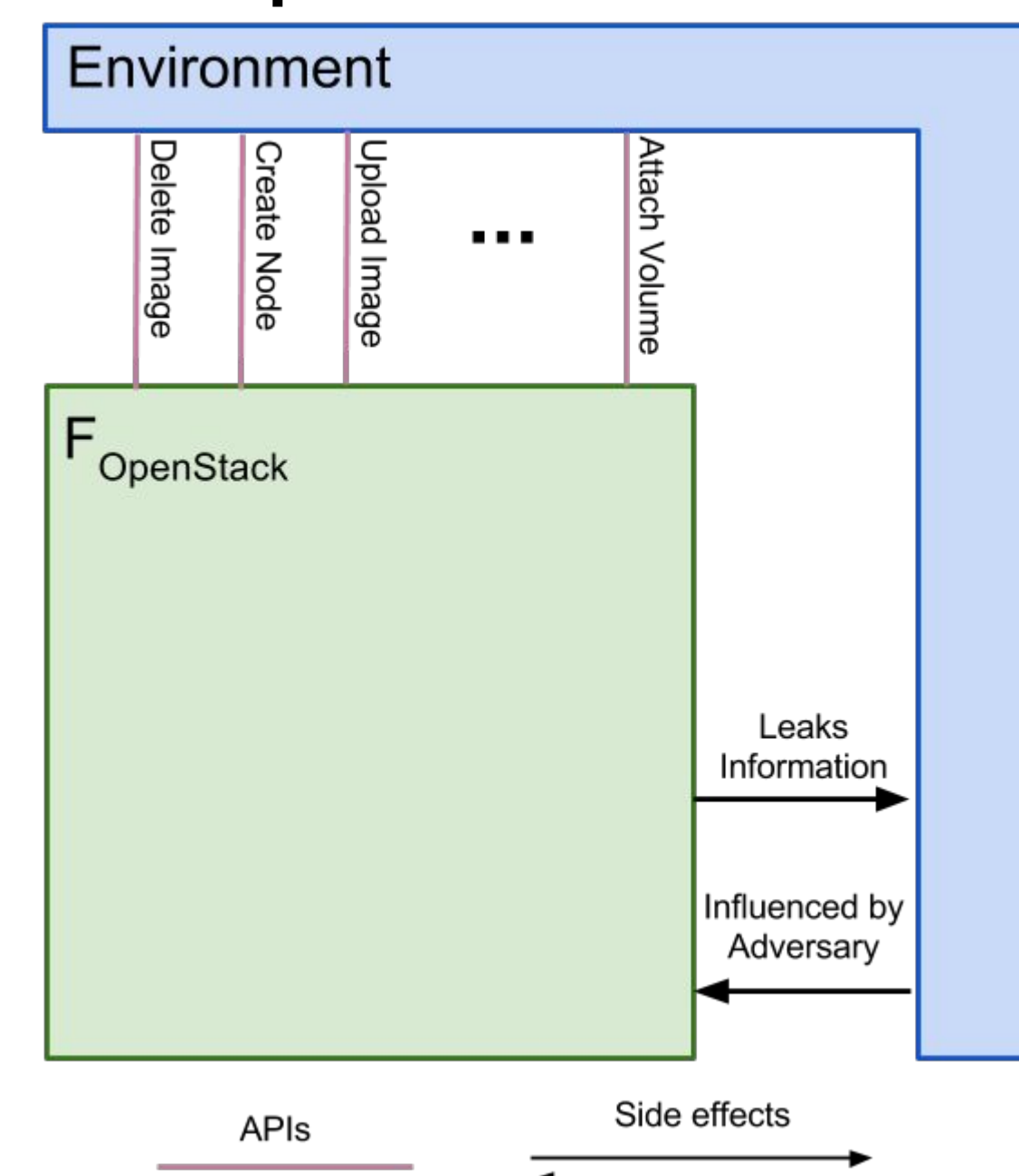
OpenStack Issues!

- Huge, distributed, and community-based development model that makes security analysis difficult
- A loose standardization mechanism
- No clear security model; you need to trust all parts of the system to gain trust in any part of the system
- The API between components is not well defined

Universal Composability

- General-purpose model for security analysis of protocols
- Perfect for modular systems
- Common understanding and common language

Goals

- Better understanding of OpenStack's security guarantees (for OpenStack Users/Customers)
- Assist in identifying highest-impact security improvements (for OpenStack Developers)
- Formal definition of OpenStack security-related functionality (for Cryptographers)
- Study the security interfaces between components which has not been studied well
- Provide a strong security guarantee for the Federated-Cloud

Define Functionality of Ideal Cloud → Define Functionality of Ideal Components → Show that Components realize the Ideal Cloud Functionality

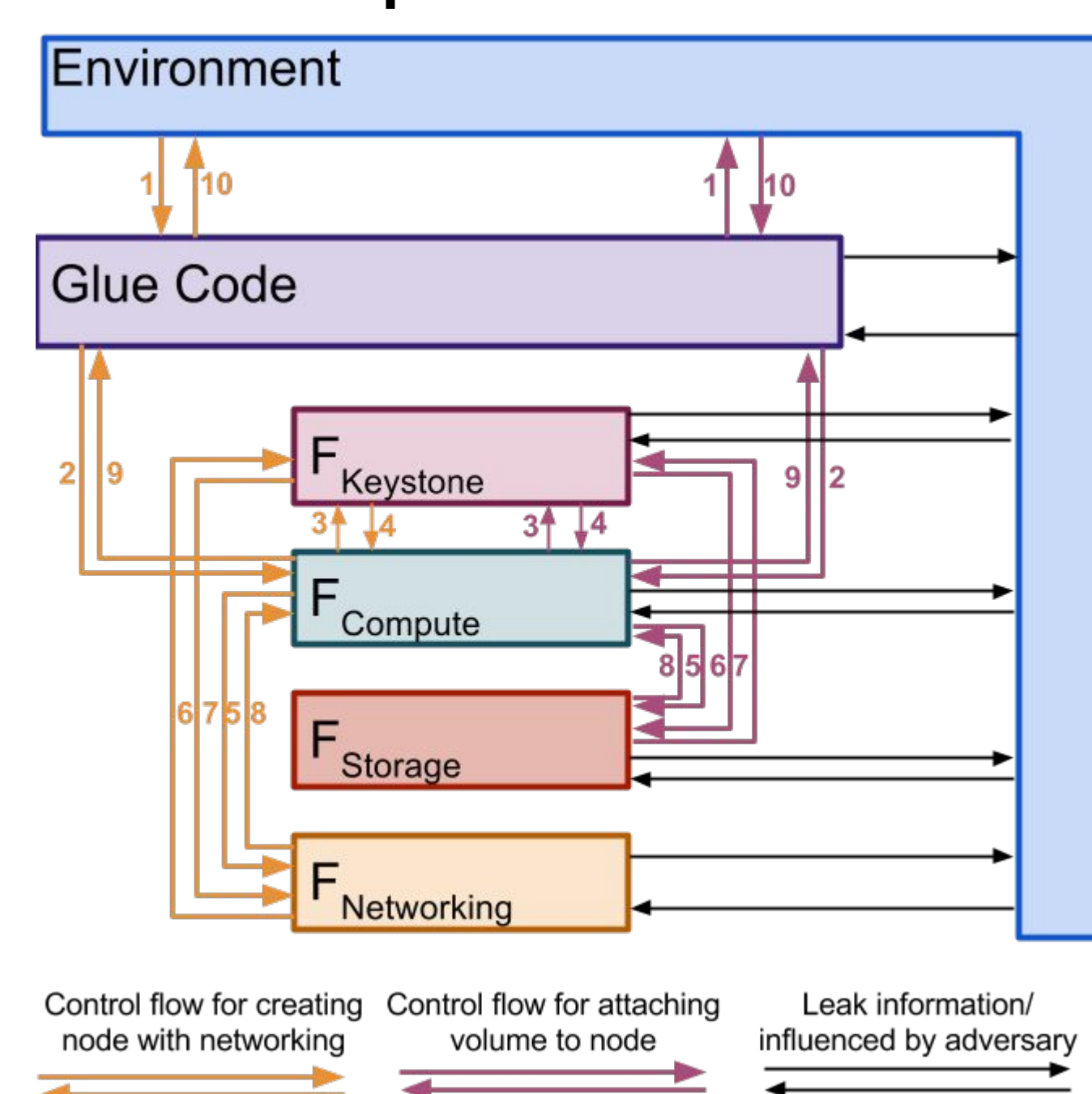Propose OpenStack Modifications to realize the Functionalities ← Propose Component Implementations that realize the Functionalities

Ideal OpenStack Functionality

Ideal Component Functionalities

OpenStack Implementation

http://docs.openstack.org/admin-guide/common/get-started-logical-architecture.html