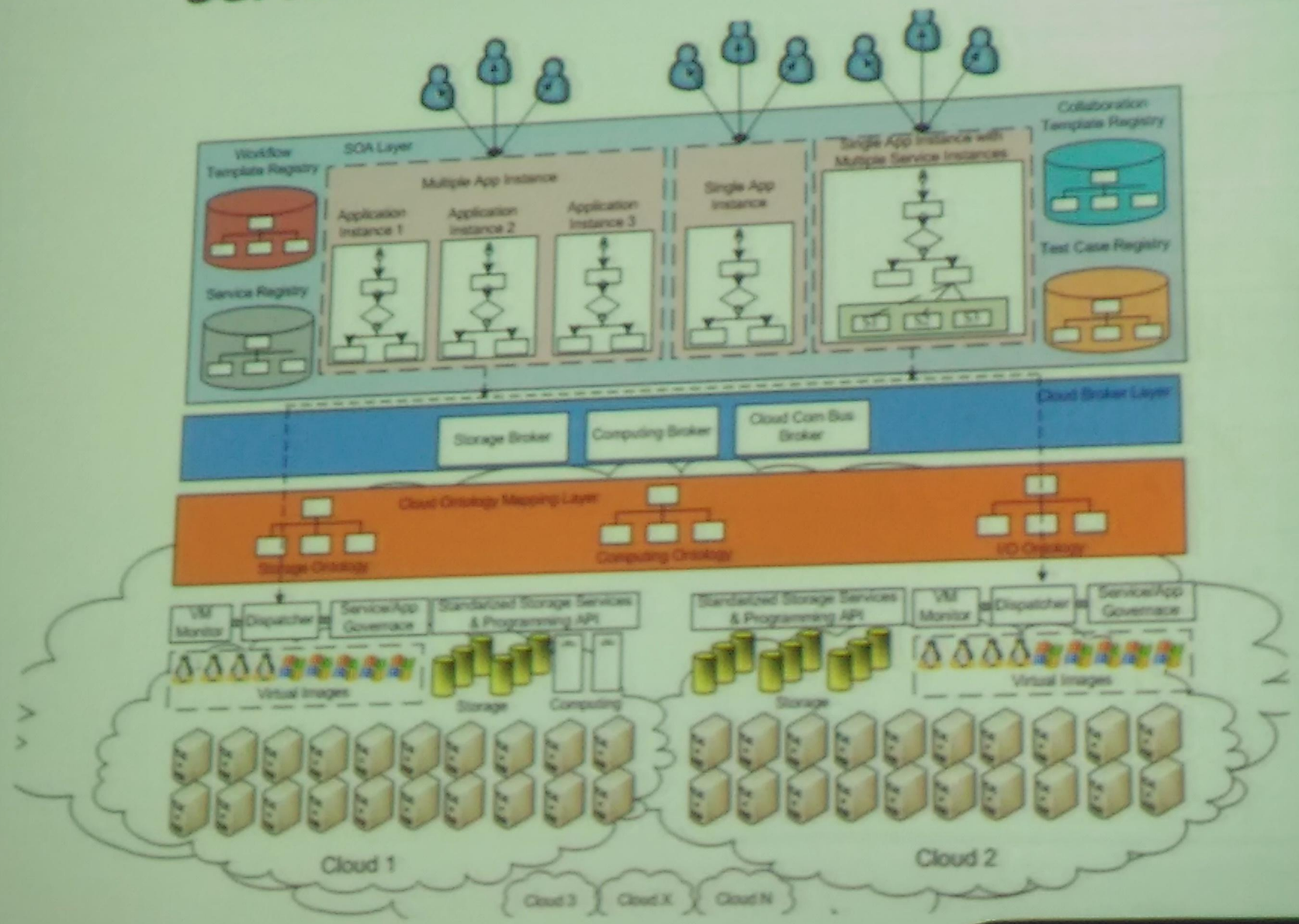
Service-Oriented Cloud Computing Architecture

- Attempts to establish the connections between SOA and cloud computing issues.
- Proposes a Service Oriented Cloud Computing Architecture.
  - Platform as a Service: PaaS
  - Software as a Service: SaaS
- SOA is an architectural pattern that guides business solutions to create, organize and reuse its computing components

SOA Reference Architecture ....

- The SOA reference architecture illustrated in Figure , describes nine layers of considerations and responsibilities
- For each layer, there are three aspects that should be supported by the SOA Reference Architecture:
  - Requirements (exemplified by the capabilities for each layer). The requirements aspect reflects what the layer enables and includes all of its capabilities.
  - Logical (exemplified by the architectural building blocks). The logical aspect includes all the architectural building blocks, design decisions, options, KPIs, etc.
  - Physical (this aspect will be left to the implementation of the standard by an adaptor of the standard). The physical aspect of each layer includes the realization of each logical aspect using technology, standards and products necessary to realize and construct the architecture.

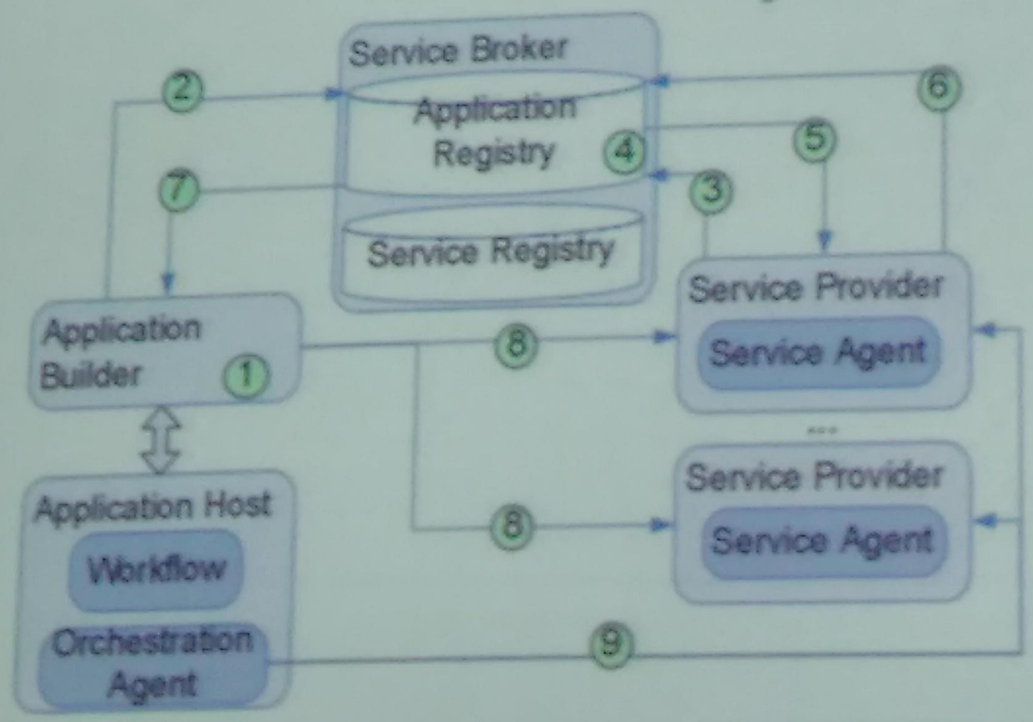
Service Oriented Cloud Computing



Multi-tenancy Architecture

- Multiple Application Instance better isolation among different tenants
- Single Application Instance not scale as well as the latter

Consumer-Centric Service-Oriented Architecture



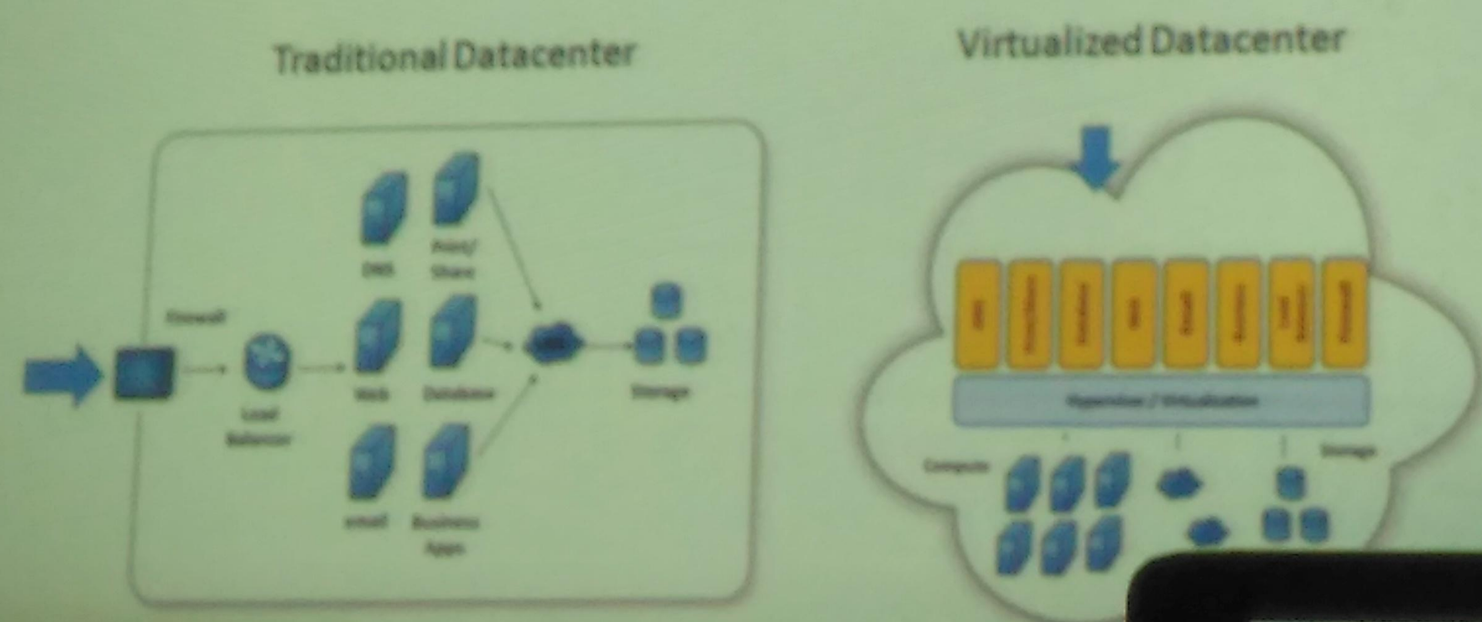
1: CCSOA Architecture

CCSOA

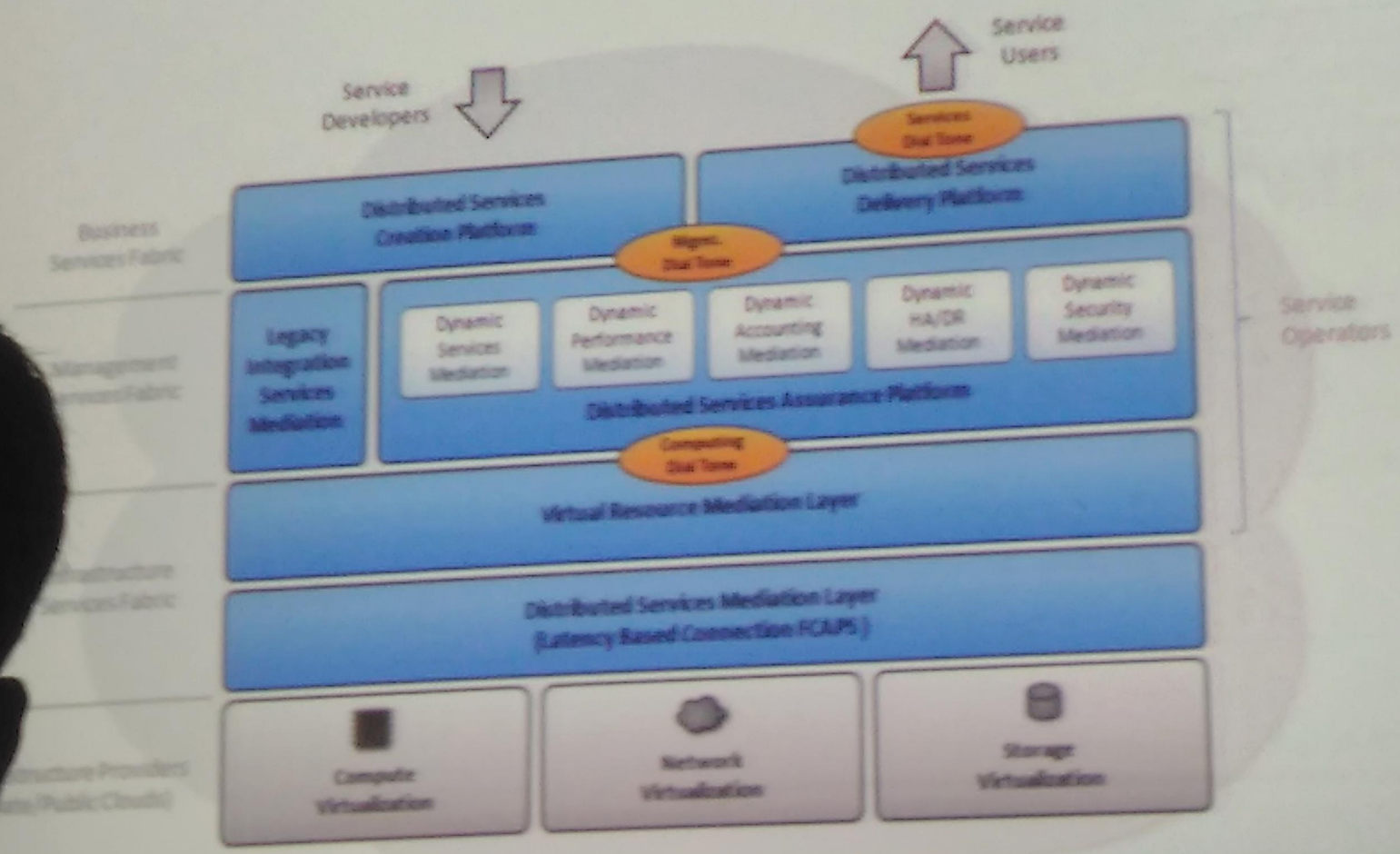
1. An application builder develops an application template
2. The application template is registered
3. Provider subscribed to the application registry
4. Automatic matching between the requested and registered application templates.
5. Find an application template
6. Submits it to an application template
7. Service broker will notify the application builder
8. Builder test and evaluate the service
9. Service into the target application.

Next generation Cloud Computing Architecture

- Computer can no longer be thought of in terms of the physical enclosure
- Cloud ideally comprises a pool of physical compute resources



Next Generation Cloud Computing Infrastructure



Network Virtualization

- Almost become necessary to eliminate the mess of cables.
- Needed to multiple HBAs and NICs for each application with a single high speed Ethernet connection and a virtual switch.

Some Important Terms

- **Composability:** ability to build applications from component parts. A composable component must be:
  - Modular: It is a self-contained and independent unit that is cooperative, reusable, and replaceable.
  - Stateless: A transaction is executed without regard to other transactions or requests.
- A PaaS or SaaS service provider gets the same benefits from a composable system that a user does, some of these are:
  - Easier to assemble systems
  - Cheaper system development
  - More reliable operation
  - A larger pool of qualified developers
  - A logical design methodology

Some Important Terms

- **Infrastructure:** Infrastructure as a Service (IaaS) rely on virtual machine technology
- Virtual servers described in terms of a machine image or instance
- Described in terms of real servers delivering a certain number of microprocessor (CPU) cycles, memory access, and network bandwidth to customers
- software that runs in the virtual machines defines the utility of the cloud computing system.
- Virtual Machine Monitor (VMM), also called a hypervisor is the low-level software that allows different operating systems to run in their own memory space and manages I/O for the virtual machines.

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- **Platforms:**
  - A software layer used to create higher levels of service.
  - Platforms represent nearly the full cloud software stack, missing only the presentation layer that represents the user interface.