Cloud User Roles

Establishing standards for describing core tasks of cloud creators, providers, and consumers

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Abstract---**In order to design, build, and provide cloud based solutions that best meet customers' needs, it is essential to understand the skills, goals, primary tasks, and responsibilities of the people or organizations involved throughout the cloud service lifecycle. At IBM®, we developed a set of user roles that are used to describe the tasks of the people who interact with a cloud based Information Technology system. The three core roles of Cloud Service Creator, Cloud Service Provider, and Cloud Service Consumer create the base for reflecting the close interaction between developers, providers, and consumers in order to achieve the optimum service flow. The development of a single role as well as the entire taxonomy of roles is guided by a framework of well-defined principles.**

Keywords---User roles; persona; cloud computing; user research; interaction design

I. User Roles and Their Value

Understanding the users who will be using a product or service is a critical part of product and service design. This includes their characteristics, goals, responsibilities, daily tasks and skills. A special challenge for developing information technology (IT) products and services is the sheer number of users and the breadth of products involved [1,2]. Additionally, people with the same responsibilities often have different job titles, and people with the same job titles often have different responsibilities [3,4]. While it might be challenging, it is important to model these responsibilities, because mismatching user roles and the heterogeneous requirements of technology inherently leads to systems that are more difficult to manage [5]. We have developed a framework for user roles and applied it to the development of a taxonomy of cloud user roles to capture the diverse ways that tasks and responsibilities might be distributed across different cloud scenarios.

User roles describe a set of skills, tasks, and responsibilities that are clustered together [6]. While personas [7,8] are also commonly used to model users, we have based our framework on developed user roles to make our artifacts more generalizable, because user roles can be easily used to compose personas to fit a wide variety of products and customer environments of different sizes. As cloud computing becomes more prevalent in businesses, it has transformed many IT jobs and created new ones. As a result, we may see uncertainty about how responsibilities might be realized in real jobs. The cloud user roles describe the sets of tasks required to create, provide, manage and consume cloud services in a modular way that can be flexibly assembled to accommodate different scenarios.

A consistent set of user roles benefits all parties. Understanding the cloud user roles and their business requirements helps IBM deliver the solutions their clients and partners need to effectively and efficiently run their business. Furthermore, the roles provide a vehicle for consistently communicating requirements and business needs. By organizing typical cloud tasks into a set of standard user roles, IBM development teams, vendors, and customers can more readily share experiences throughout the cloud development and operations process. Furthermore, having a complete understanding of the cloud user roles and their tasks can enable customers to effectively plan their workloads, resources, and staff for their future cloud applications and environments.

The cloud user roles were developed in the context of IBM's Cloud Computing Reference Architecture [9], as a standard to support IBM's internal as well as external cloud ecosystem readiness. We believe these definitions will aid the development of common standards and consistency across many cloud providers. By using similar nomenclature to define the various tasks related to creating, deploying and managing cloud solutions we reduce the risk of complexity or confusion for those interacting with cloud solutions, and increase the interoperability of cloud services.

II. Governing Principles

The creation and usage of the cloud user roles are governed by three well-defined principles:

A. *Governing Principle 1 - Organize roles in a taxonomy with recursive instantiation*

While these roles are intended to cover a wide range of scenarios, we have defined a common pattern of three core cloud user roles:

- **Cloud Service Provider** provides the appropriate hardware and software infrastructure to run the service and the people to manage and maintain this infrastructure.
- **Cloud Service Creator** creates the individual hardware and software components needed for the service.
- **Cloud Service Consumer** purchases or obtains the service from the Service Provider and possibly the Cloud Service Creator.

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Each role can be filled by a human being or an entire organization. For example, a receptionist at a doctor's office (the consumer) may use a specialized, multi-tenant application for managing patient insurance claims, which is hosted on the internet (by the provider) and was created by a third party vendor (the creator).

Depending on the context, and due to the recursive nature of the roles, a Service Provider may turn into a Service Consumer, and a Service Consumer into a Service Provider, while the Service Creator may be independent or part of either the Consumer or the Provider.

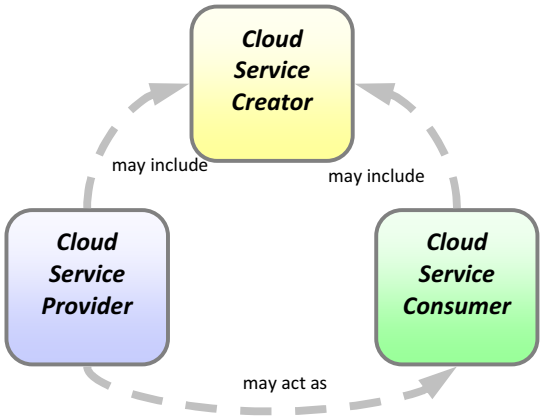

Figure 1. Core cloud user roles

B. *Governing Principle 2 - Build roles around mutually-exclusive common task clusters*

The cloud roles are not intended to represent every single cloud scenario. Rather, they are a practical model of the way tasks are commonly organized. We delineate a cloud role by three criteria:

1. It comprises a distinctive set of typical tasks that could be and frequently is performed by one person.
2. The particular set of tasks warrants dedicated cloud service design decisions.
3. It is mutually exclusive in most circumstances.

C. *Governing Principle 3 - Use nesting relationships to organize roles*

While we propose three core roles, in reality, there will be specializations within each of these core roles, which are captured through parent-child relationships (in other contexts, such as outsourcing engagements, you may also find a fourth core Integrator role, which focuses on intermediation and value-add services).

The relationship of child to parent role is an *Is-A* relationship. Each child node is an instance, or token, of the parent. For example, an operations manager is a specialization of the core Cloud Service Provider role, and a network administrator is a specialization of the operations manager role. The parent role, however, is not necessarily the sum of all the listed child nodes. If instantiated separately, it may assume additional responsibilities and tasks.

III. Summary and Future Directions

We developed a framework for the definition of a single cloud user role as well as the taxonomy of the entirety of cloud roles. Expanding from the three core cloud roles introduced above, we extended the set of roles to some 30 more detailed creator, provider and consumer roles.

The set of roles will continue to be subject to change. As cloud computing adoption grows over the coming years, the tasks and responsibilities of people who build and support systems within their businesses will change. The relationships among business partners and resellers will be key influencers on the evolution of the cloud role definitions. At the same time, this framework of cloud user roles transcends these changes, since the roles are defined at a task-level, not at an individual job or functional level.

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