The Definition of Cloud Printing

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Directly based on:
National Institute of Standards and Technology, Information Technology Laboratory: The NIST Definition of Cloud Computing, Version 15, 10-7-09

Note 1: Cloud Printing is still an evolving paradigm. Its definitions, use cases, underlying technologies, issues, risks, and benefits will be refined in a spirited debate by the public and private sectors. These definitions, attributes, and characteristics will evolve and change over time.

Note 2: The Cloud Printing industry represents a large ecosystem of many models, vendors, and market niches. This definition attempts to encompass all of the various cloud approaches.

Definition of Cloud Printing:

Cloud Printing is a model for enabling convenient, on-demand network printing access to a shared pool of configurable printing resources (e.g., networks, servers, storage, applications, printers and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud printing model promotes availability and is composed of five essential **characteristics,** three **service models**, and four **deployment models**.

Essential Characteristics:

On-demand self-service. A consumer can unilaterally provision printing and printer capabilities, such as transforms, as needed automatically without requiring human interaction with a print service provider.

Broad network access. Printer and Printing capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, laptops, and PDAs).

Resource pooling. The provider's printing and printer resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, network bandwidth, and virtual machines.

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Rapid elasticity. Printer and Printing capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time.

Measured Service. Cloud Printing systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, consumables, pages printed and active user accounts). Resource usage can be monitored, controlled, and reported providing transparency for both the provider and consumer of the utilized service.

Service Models:

Cloud Software as a Service (SaaS). The capability provided to the consumer is to use the provider's printing and printer services running on a cloud infrastructure. The printers are accessible from various client devices through a thin client interface such as a web browser (e.g., web-based email). The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual printers capabilities, with the possible exception of limited user-specific printer and/or printing configuration settings.

~~*Cloud Platform as a Service (PaaS).* The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.~~ ***< Interesting, should the consumer (not ISVs or IHVs) be able to create, have and deploy applications that interface to the printer and/or printing services?>***

~~*Cloud Infrastructure as a Service (IaaS).* The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications, and possibly limited control of select networking components (e.g., host firewalls).~~ ***< Interesting, should the consumer (not ISVs or IHVs) be able to create, have and deploy applications that interface to the printer and/or printing services?>***

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Deployment Models:

Private Cloud Printing. The cloud printing infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.

Community Cloud Printing. The cloud printing infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be managed by the organizations or a third party and may exist on premise or off premise.

Public Cloud Printing. The cloud printing infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.

Hybrid Cloud Printing. The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds).

Note: Cloud Printing services take full advantage of the cloud paradigm by being service oriented with a focus on statelessness, low coupling, modularity, and semantic interoperability.

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