# Visualizing and Predicting Heart Diseases with an Interactive Dash Board

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**IBM Cloud:**

IBM offers three hardware platforms for cloud computing. These platforms offer built-in support for virtualization. IBM also offers a virtualization application infrastructure, Web sphere, which supports programming models and open standards for virtualization.

The management layer of the IBM cloud framework includes IBM Tivoli middleware. Management tools provide capabilities to regulate images with automated provisioning and de-provisioning, monitor operations and meter usage while tracking costs and allocating billing. The last layer of the framework provides integrated workload tools. Workloads (in the context of cloud computing) are services or instances of code that can be executed to meet specific business needs. IBM also offers tools for cloud based collaboration, development and testing, application development, analytics, business-to-business integration, and security.

The IBM SmartCloud brand includes three primary services: the infrastructure, software, and platform services, each of which is offered through public, private and hybrid cloud delivery models. IBM places these offerings under three umbrellas: the SmartCloud Foundation, SmartCloud Services and SmartCloud Solutions.

The SmartCloud Foundation consists of the infrastructure, hardware, provisioning, management, integration and security that serve as the underpinnings of a private or hybrid cloud. Built using those foundational components, PaaS, IaaS and backup services make up SmartCloud Services. Running on this cloud platform and infrastructure, SmartCloud Solutions consist of a number of collaboration, analytics and marketing SaaS applications.

IBM also builds cloud environments for clients that are not necessarily on the SmartCloud Platform. For example, features of the SmartCloud platform—such as Tivoli management software or IBM Systems Director virtualization—can be integrated separately as part of a non-IBM cloud platform. The SmartCloud platform consists solely of IBM hardware, software, services and practices.

IBM SmartCloud Enterprise and SmartCloud Enterprise+ are designed to compete with products like those of Rackspace and Amazon Web Services. Erich Clementi, vice president of Global Technology Services at IBM, said in 2012 that the goal with SmartCloud Enterprise and SmartCloud Enterprise+ was to provide an Amazon EC2-like experience primarily for test and development purposes and to provide a more robust experience for production workloads.

In 2011, IBM SmartCloud integrated Hadoop-based InfoSphere BigInsights for big data, Green Hat for software testing and Nirvanix for cloud storage. In 2012, the then new CEO Virginia Rometty said the company planned to spend $20 billion on acquisitions by 2015.

- Private cloud, owned and operated by the customer
- Private cloud, owned by the customer, but operated by IBM (or another provider)
- Private cloud, owned and operated by IBM (or another provider)
- Virtual private cloud services (based on multi-tenanted support for individual enterprises)
- Public cloud services (based on the provision of functions to individuals)

The majority of cloud users choose a hybrid cloud model, with some workloads being served by internal systems, some from commercial cloud providers and some from public cloud service providers.

On August 25, 2011, IBM announced the release of a new hybrid cloud model orchestrated by IBM WebSphere Cast Iron integration of on- and off-premises resources. Enterprises can use Cast Iron integration to link their public cloud appliances— hosted on environments like Amazon EC2, Google Apps, Salesforce.com, Oracle CRM, SugarCRM and a number of others—to their existing systems or in-house, private cloud environments. Cast Iron Integration aims to reduce the time and effort needed for customized coding, in favor of simple workload provisioning through Tivoli Management Framework.

The IBM public cloud offering, SmartCloud Enterprise, was launched on April 7, 2011. SCE is hosted IaaS with service level agreements (SLA)s, and can be offered in a private, public or hybrid model. The environment is hosted on IBM servers (System p or System x), with a standard set of software images to choose from.

IBM participates in several cloud standards initiatives within various standards development organizations involved in cloud service models IaaS, PaaS and SaaS, all of which work toward improvements in cloud interoperability and security.

IBM is a member of The Open Group, a council that works for the development of open, vendor-neutral IT standards and certifications. Other members of the group include HP, Oracle, SAP and numerous others.[27] IBM contributed the Cloud Computing Reference Architecture in February 2011 to The Open Group as the basis of an industry-wide cloud architecture. IBM's CCRA is based on real-world input from many cloud implementations across IBM. It is intended to be used as a blueprint/guide for architecting cloud implementations, driven by functional and non-functional requirements of the respective cloud implementation. HP and Microsoft have also published Cloud Computing Reference Architectures.

Within the IaaS space, IBM is a member of the Cloud Management Work Group (CMWG) within the Distributed Management Task Force (DMTF), which released a draft version of their IaaS APIs, called the Cloud Infrastructure Management Interface (CIMI), on September 14, 2011. The CIMI APIs define a logical model for the management of resources within the Infrastructure as a Service domain. With these APIs, clients can create, manage and connect machines, volumes and networks.