Cloud Computing Applications

Session 3

Session objectives

- Cloud Computing in
  1. Educational Institutes
  2. E-governance
  3. Health Sector
  4. Agriculture

Cloud Computing in **Educational Institutes**

Cloud Computing in Academia

- Five different cloud usage models have been introduced to the educational institutes:

1. Cloud-based storage
2. Virtual Hands-on Laboratories (VHLs)
3. Software as a Service (SaaS)
4. Platform as a Service (PaaS)
5. Infrastructure as a Service (IaaS)

Cloud Based Storage

- Cloud-based storage used to facilitate collaboration between students by allowing them to work together on the same documents.

http://www.clouddip.com/

http://aws.amazon.com/s3/

http://www.dropbox.com/

Virtual Hands-on Laboratories

- Used to address many of the challenges faced by educators struggling with the desire to
  1. provide their students with realistic learning environments.
  2. protecting production systems from undesirable and potentially illegal interference.
- In this usage model, a number of VMs are allocated to each students to test of execute a certain scenario.
- Ease up the process of creating scenarios as VMs can be archived or deployed by simply copying the files.
- Ease up the process of exchanging scenarios where the configured VMs can be stored on a CD or DVD.
- Same concepts are also applied in providing testing environments in software companies.

Software As A Service (on-demand software)

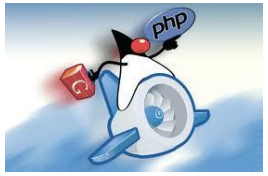
- Users access applications and its associated data directly from the cloud without getting them installed on their machine using a thin client like web browsers over the Internet.
  - Solving many compatibility issues
  - Reducing universities' IT complexity and cost
  - Providing anywhere anytime access.

- **<u>Examples:</u>**

- A number of examples of using SaaS in educational institutes based on Google Apps - Education Edition(http://www.google.com/apps/intl/en/edu/university.html).

Platform as a Service (PaaS)

- Users are provided with a container environment to run/test their software components where all of the software required serving the users' purpose have been already installed and configured.
  - Microsoft Azure (http://www.microsoft.com/windowsazure/)
  - Google App Engine (http://code.google.com/appengine/)



- This service model would benefit computer science students and instructors where there would be no need to spend time setting up the development environment.

- Students in need for access to licensed platform (MATLAB, SPSS) that is only available on the on-campus computers can also benefit from this service model by accessing the platform on the cloud from anywhere.

Examples:

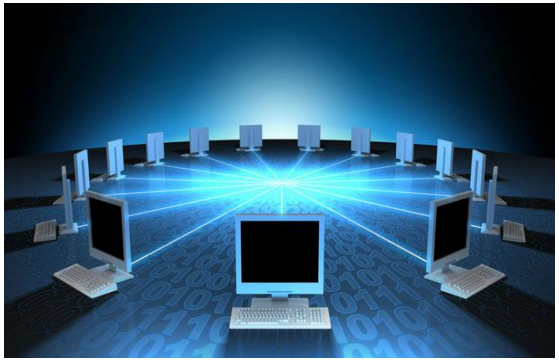
-"**EduCloud**: PaaS versus IaaS Cloud Usage for an Advanced Computer Science Course

-**Virtual Computing Laboratory (VCL)** Technology to Power Cloud Computing.

Infrastructure as a Service (IaaS)

- Virtualization is used to provide computational resources to users though the user is the one responsible for installing and configuring all needed software.

- This usage model is the closest to the Grid concept.



Examples:

-Amazon EC2 (http://aws.amazon.com/ec2/)

Cloud Computing in **E-governance**

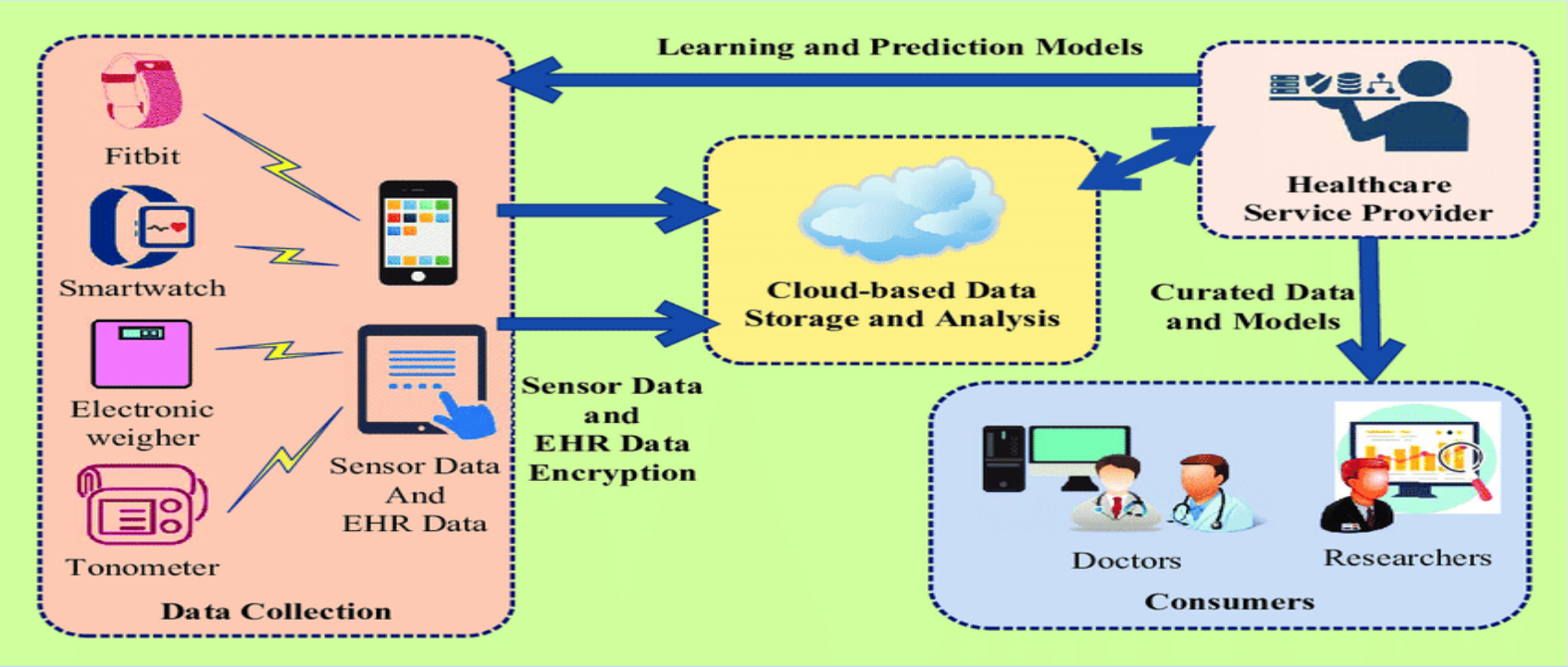
Future Solution for E-governance

- Using cloud computing and service-oriented architecture in the public sector should improve the conditions for development and deployment of e-government solutions.
  - Cloud computing permits to uniformly cover the whole country with e-government solutions, independently of divergence of local administrative units.
  - Service-oriented architecture facilitates provision of compound services covering whole customer processes, where a customer may be a citizen or an enterprise.

E Government

- **Vision:** Achieving superior levels of consumer satisfaction for the Public Sector through the provision and assurance of best quality Public Sector cloud services characterized by measurable benefits and improved value for money.
  - Designing highly available and reliable services
  - Offering services through catalogues and portfolios in an AppStore
  - Providing service testing, assurance, and deployment enabling flexibility
  - Ensuring inter-organizational incident, event, problem and change management
  - Designing service reporting and performance management based on business outcomes
  - Provisioning a permanent approach to continual service improvement (CSI)

Cloud Computing in **Health Sector**



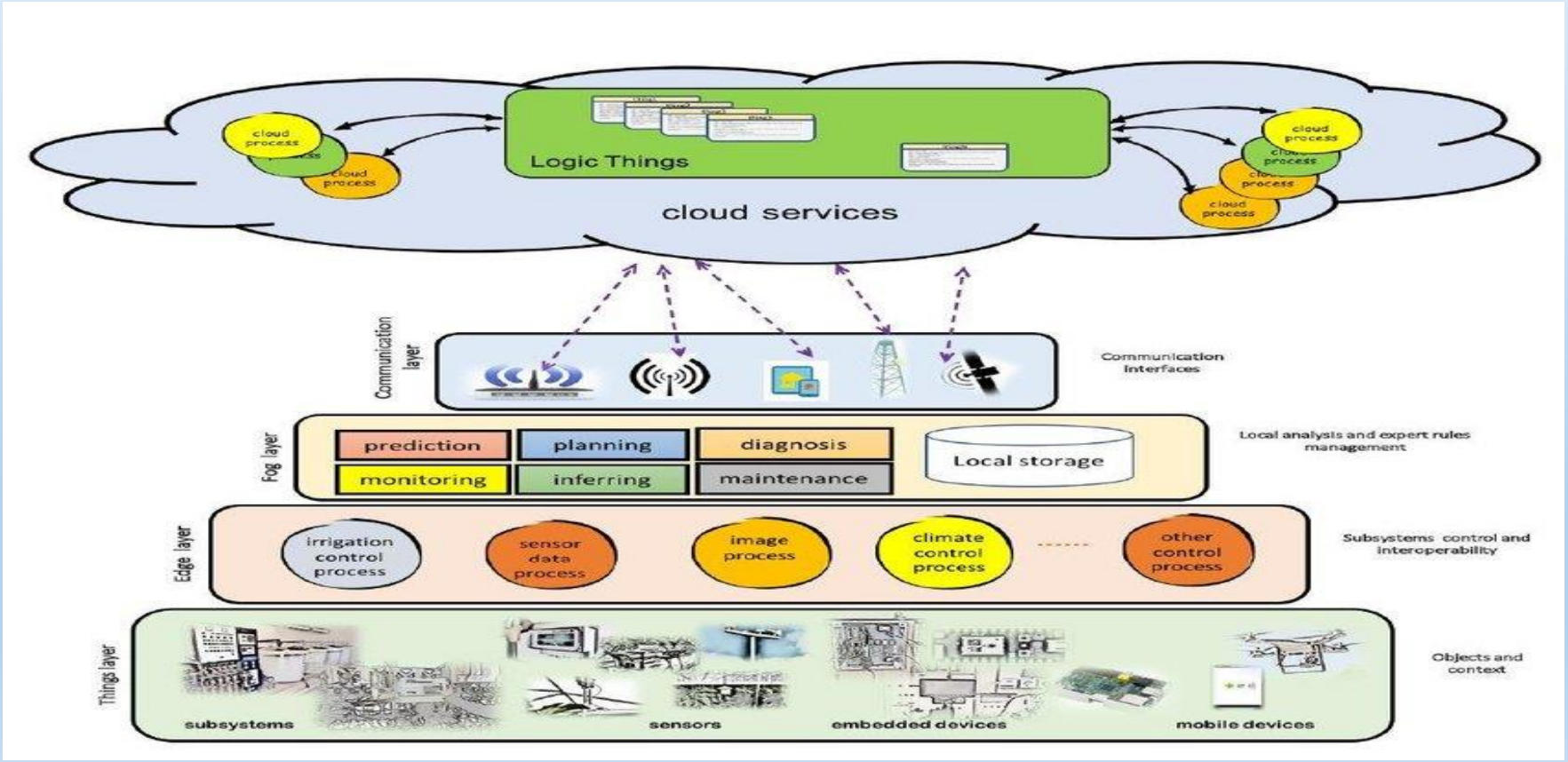
What does a patient need?

- It’s simple: the ability to
  - record medical history as well as current data, including health events, test results, vital stats, medications.
  - communicate this data to health care providers.

Cloud in Health Sector

- **Cost :** Cloud programs, platforms and storage take the IT strain away from individual organizations instead of having everything in-house and paying for server capacity and programs that you might only use occasionally.
- **Scalability :** Cloud computing can be instantly and almost infinitely expandable. Instead of whenever you want to use a new program it has to be installed or upgraded and tested on multiple machines.
- **Ubiquity :** Cloud computing can help by making the same application available over a large geographic area, without the need for "custom plumbing" to connect all the disparate systems.
  - Home monitoring, whereby data from measurement devices (e.g., a glucometer) are streamed to a provider's private cloud with end-to-end encryption.
- **Collaboration :** Storing patient data in centralized databases for restricted access by authorized persons (e.g., for research purposes). Storing practice guidelines in public clouds and exchange experience.
- **Risk :** Cloud automates the process of providing multiple, geographically dispersed backups, meaning that even a natural disaster in one area is unlikely to take down your IT systems.

Cloud Computing in **Agriculture**



Cloud computing in agriculture sector

- Crop planning, monitoring, and irrigation optimization system.
- Introduce **Agriculture As A Service**

Cloud Advantages to Farmers

- No capital investment by farmer
  - No Servers
  - No Software
  - No Maintenance
  - No Data backups
  - No Infrastructure
- Share his information with farmers planting the same crops to exchange expertise.