## Understanding the Cloud

**OSI (Open Source Interconnection) 7 Layer Model**

<table>
<thead>
<tr>
<th>Layer</th>
<th>Application/Example</th>
<th>Central Device/Protocols</th>
<th>DOD4 Model</th>
</tr>
</thead>
</table>
| Application (7) | End User layer  
Serves as the window for users and application processes to access the network services  
Program that opens what was sent or creates what is to be sent  
Resource sharing • Remote file access • Remote printer access • Directory services • Network management | User Applications • SMTP              |            |
| Presentation (6) | Syntax layer  
Encrypt & decrypt (if needed)  
Character code translation • Data conversion • Data compression • Data encryption • Character Set Translation | JPEG/ASCII • EBDIC/IFF/PICT | Process |
| Session (5) | Synch & send to ports (logical ports)  
Session establishment, maintenance and termination • Session support • perform security, name recognition, logging, etc. | Logical Ports • RPC/SUN/JFS • NetBIOS names | Gateway |
| Transport (4) | TCP  
Host to Host, Flow Control  
Message segmentation • Message acknowledgement • Message traffic control • Session multiplexing | TCP/SPX/UDP | Host to Host |
| Network (3) | Packets ("letter", contains IP address)  
Routing • Subnet traffic control • Frame fragmentation • Logical-physical address mapping • Subnet usage accounting | IP/IPX/ICMP | Internet |
| Data Link (2) | Frames ("envelopes", contains MAC address)  
NIC card — Switch — NIC card  
(end to end) establishes & terminates the logical link between nodes • Frame traffic control • Frame sequencing • Frame acknowledgment • Frame delimiting • Frame error checking • Media access control | Switch Bridge WAP PPP/SLIP | Can be used on all layers |
| Physical (1) | Physical structure  
Cables, hubs, etc.  
Data Encoding • Physical medium attachment • Transmission technique • Baseband or Broadband • Physical medium transmission Bits & Watts | Hub | Network |
Understanding the Cloud

**SaaS**
- Software as a Service
- Use It
  - EIM
  - Incidents
  - EHS
  - Tasks
  - Waste

**PaaS**
- Platform as a Service
- Build with It
  - App development
  - Messaging
  - Dashboards
  - Integration

**IaaS**
- Infrastructure as a Service
- Move to It
  - Networking
  - Security
  - System management
  - Scalability

**SaaS**
- **CONSUME**
  - Email
  - CRM
  - Collaborative
  - ERP

**PaaS**
- **BUILD ON IT**
  - Application Development
  - Decision Support
  - Web
  - Streaming

**IaaS**
- **MIGRATE TO IT**
  - Caching
  - Legacy
  - File
  - Networking
  - Technical
  - Security
  - System Mgmt
Understanding the Cloud

SAAS
- Google Docs
- Heroku
- AWS Elastic Beanstalk

PAAS
- AWS Elastic Compute Cloud (EC2)
- Microsoft Azure
- Google App Engine

IAAS
- IT administrators

Hierarchy of Needs

1. Physiological needs: basic needs for survival, such as food, water, shelter, clothing, and sleep.
4. Self-esteem: the need to be respected, the need to perceive oneself as a valuable person, and the need to achieve personal goals.
5. Self-actualization: the need for self-fulfillment, the need to be what one is capable of being, and the need to achieve personal excellence.

More control means less need for hierarchy, while less control means more need for hierarchy.
Understanding the Cloud

Pizza as a Service

Traditional On-Premises (On Prem)
- Dining Table
- Soda
- Electric / Gas
- Oven
- Fire
- Pizza Dough
- Tomato Sauce
- Toppings
- Cheese

Infrastructure as a Service (IaaS)
- Dining Table
- Soda
- Electric / Gas
- Oven
- Fire
- Pizza Dough
- Tomato Sauce
- Toppings
- Cheese

Platform as a Service (PaaS)
- Dining Table
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Software as a Service (SaaS)
- Dining Table
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Made at home
Take & Bake
Pizza Delivered
Dined Out