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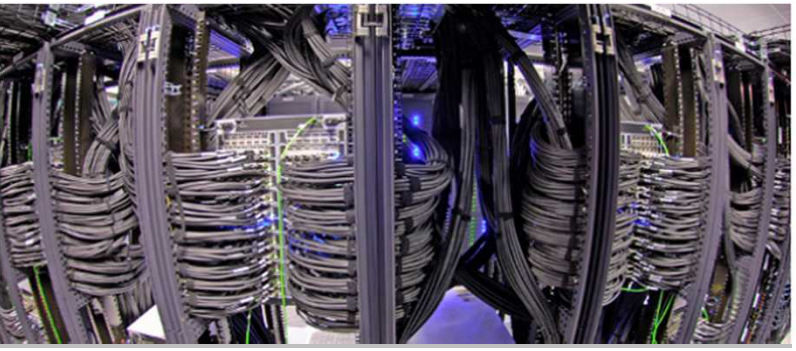

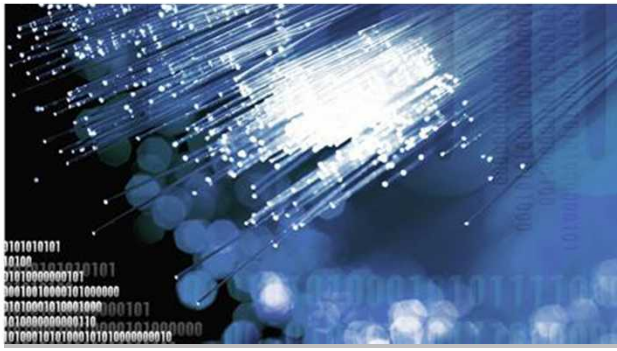

Cloud Development Strategies

A 2015 NLIT “Fueling the Fire in IT” presentation

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U.S. DEPARTMENT OF ENERGY | NNSA National Nuclear Security Administration

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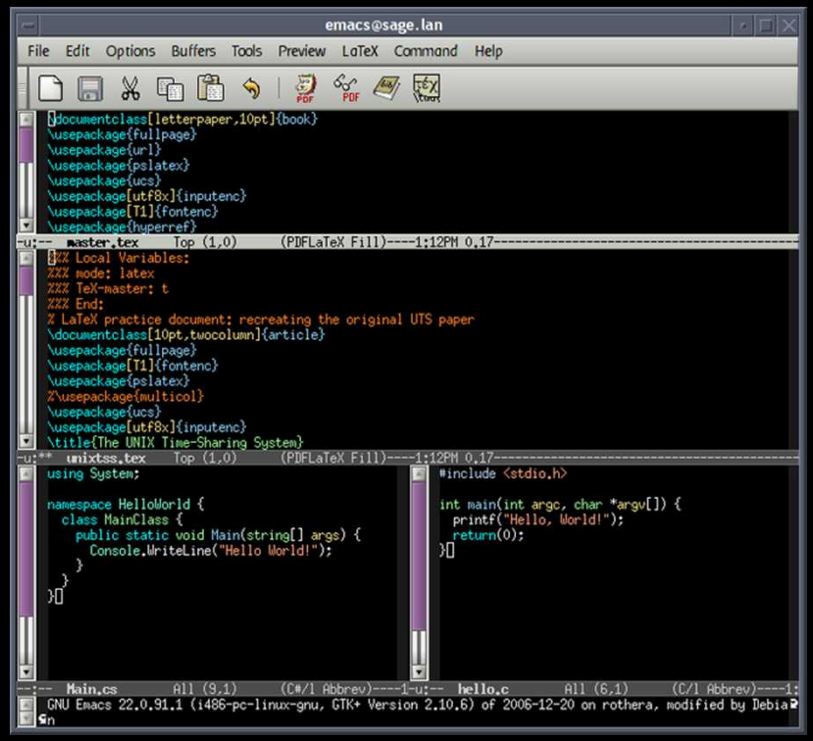
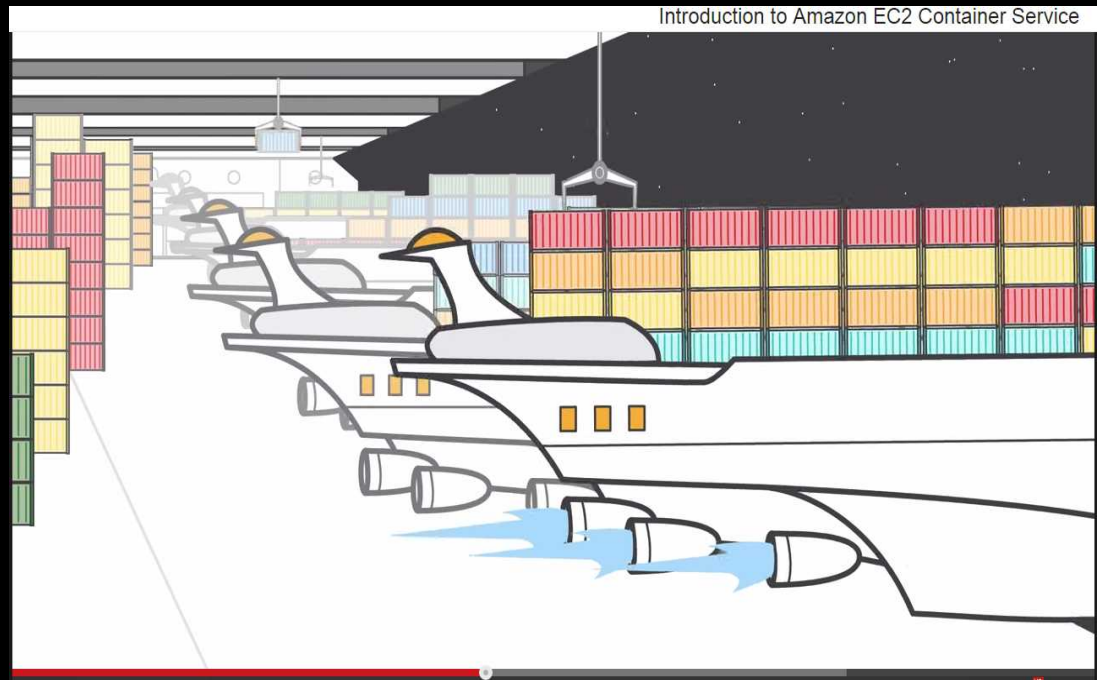
Long ago in a galaxy far away
We memorized syntax,
Fought compliers
Built monolithic apps

But Now we must
Loosely couple services
Containerize configurations
Continuously Release

How can Lab IT groups
Adapt fast enough?

Key is understanding that
Commercial Clouds provide
Developer experimentation
Space …

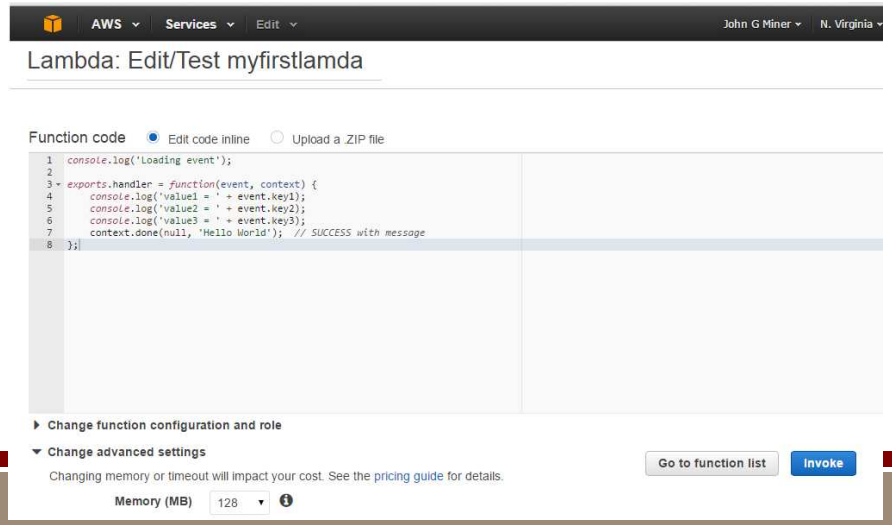




Cloud equivalent of **embryological parallelism**

- How IT people tend to adopt cloud:
  - Build an app with an installer and build it on full cloud server and release to prod
  - Deploy a canned app, tailor and release to prod
  - Deploy Package (JAR/WAR) to PaaS
  - Deploy Service in a Container
  - Deploy a Lambda from a embedded editor
- What it would look like in reverse
  - Have external events be a proxy for your event triggers
  - Create Lambda function respond to ‘events’
  - Buy a containerized service that outperforms the lamda and import it
  - Collaborate with contractors on a java app, package for internal PaaS to use the service
  - Run a installer script from a CDN that starts solution on IaaS assuming service exists
  - Create a new software concept on local host from best in bred snippets that removes the need for the service.

- Zapier > AWS SNS > Lambda Demo
- http://aws.amazon.com/lambda/

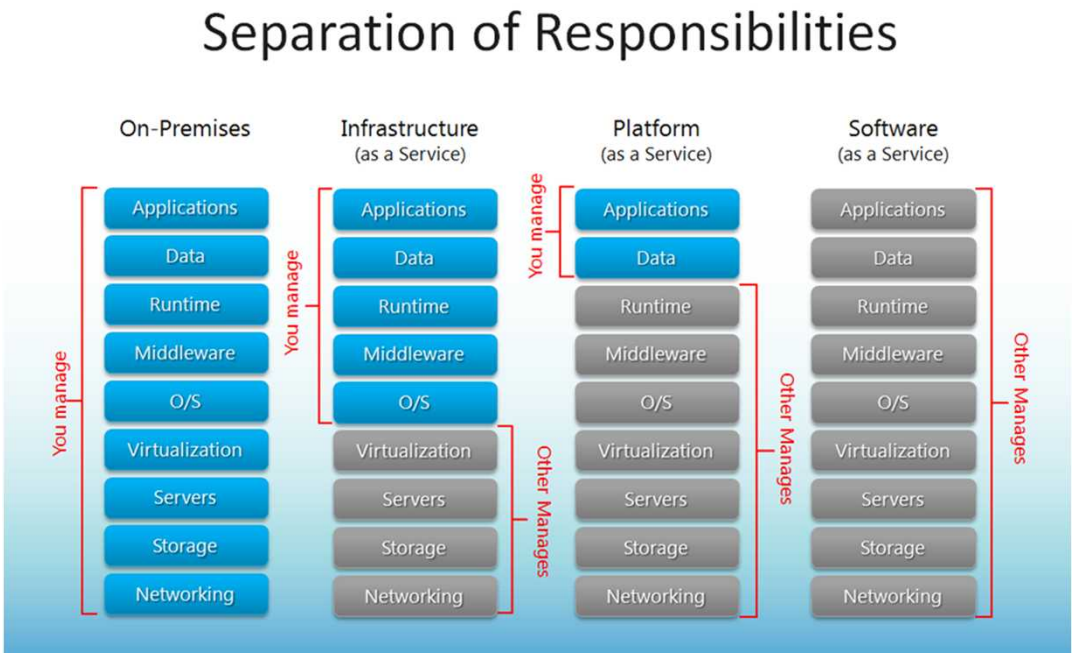


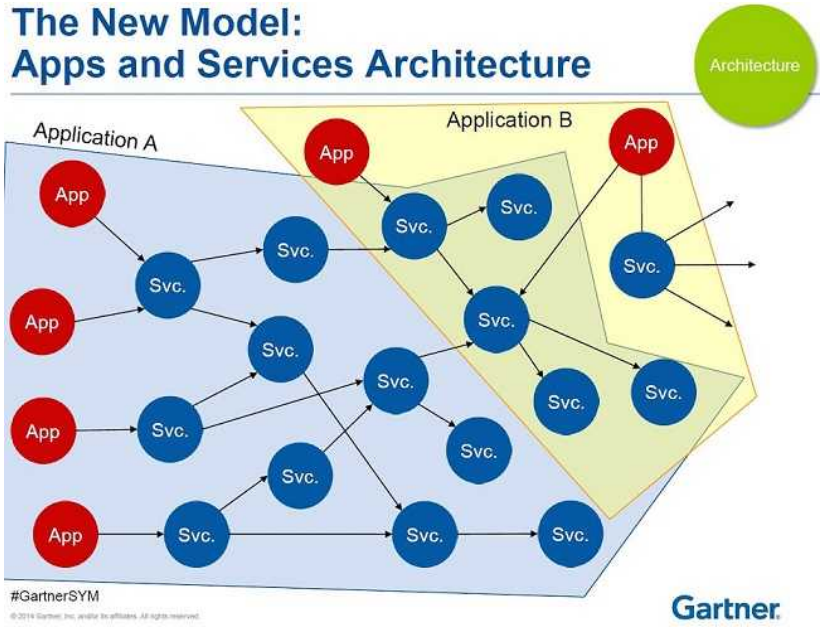
Software Source Progression

- Developed In place
- Developed Remotely
- Commercial Off the Shelf COTS (The shelf has disappeared)
- Gov Off the Shelf GOTS (Where was the shelf ?)
- Commercial from the Cloud
- Developed on the Cloud
- Developed For the Cloud (only)
- Software as a Service
- Commercial Software as a Service
- Gov Software as a Service (?)

Enterprise App Cloud Strategies

- Enterprise Application evolution from two key strategies:
  - Construct Solutions from Atomic Services
  - Deploy to Platform as a Service wherever possible
- To enable faster innovation, we have two key principles
  - Develop in the best development environment for the *project* team
  - Deploy to the best environment for the enterprise





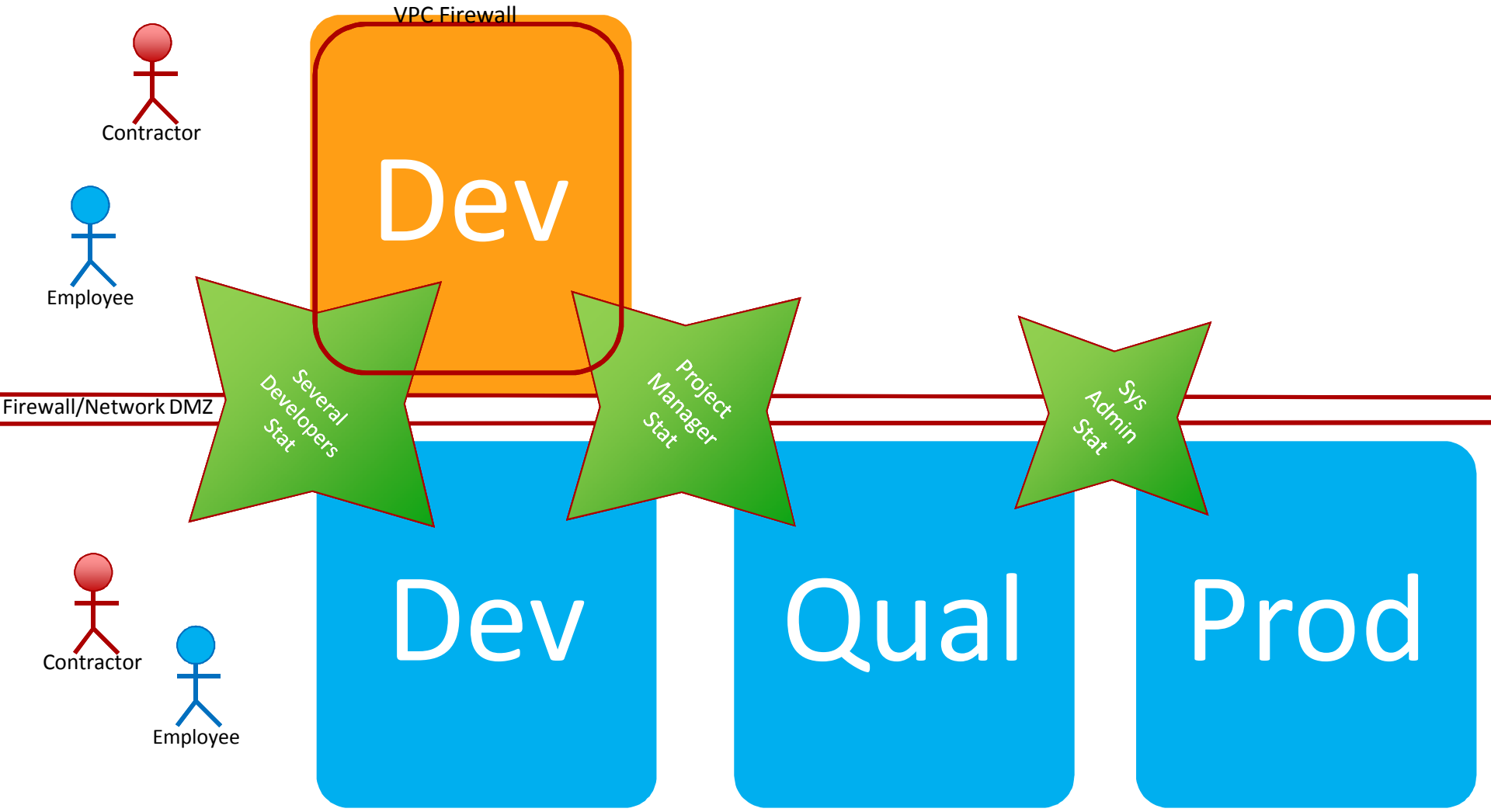
Software Defined Everything

- Router network
- Security model
- Server, cluster, installer
- Use inside->out port 80 SSL REST service for communications as much as possible
- Use Platform as a Service for portability
- Use Database as a Service for ease and obscurity
- The Developer can now change the ‘environment’ with tools they know

JSON file example snippet from Amazon, Dynamically configurable by code

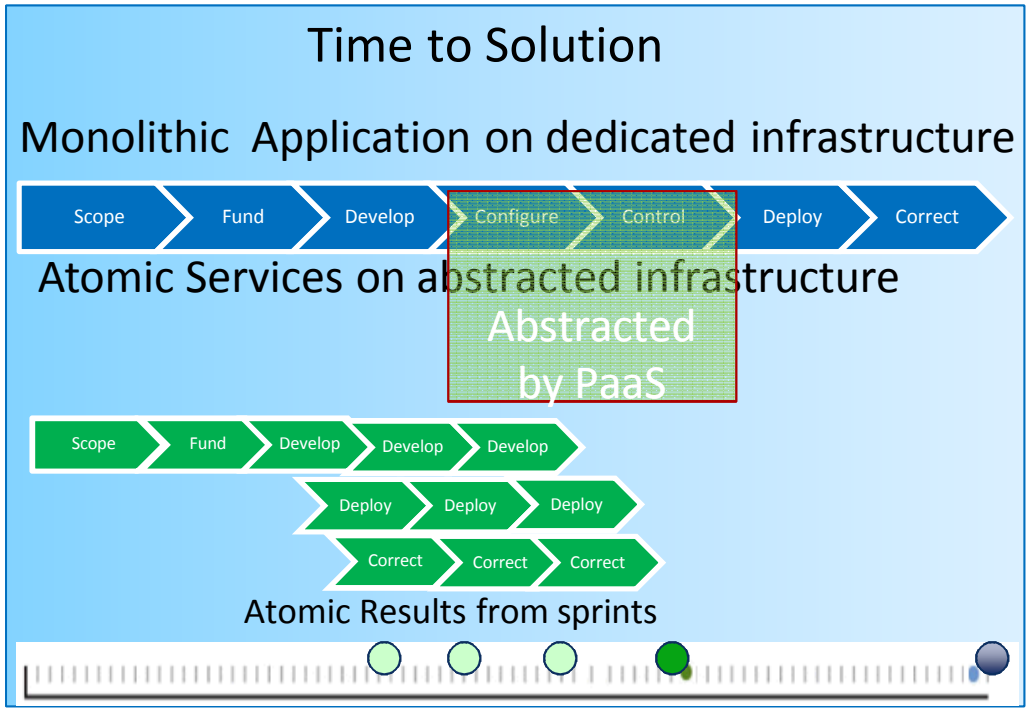
```
"myVPC": {
   "Type": "AWS::EC2::VPC",
   "Properties": {
       "CidrBlock": {"Ref": "myVPCCIDRRange"},
       "EnableDnsSupport": false,
       "EnableDnsHostnames": false,
       "InstanceTenancy": "default" }
},
"myInstance" : {
    "Type" : "AWS::EC2::Instance",
    "Properties" : {
        "ImageId": {
             "Fn::FindInMap": ["AWSRegionToAMI",{"Ref": "AWS::Region"},"64"] },
        "SecurityGroupIds" : [{"Fn::GetAtt": ["myVPC", "DefaultSecurityGroup"]}],
        "SubnetId" : {"Ref" : "mySubnet"}
  }
}
```

External Development Colaboration

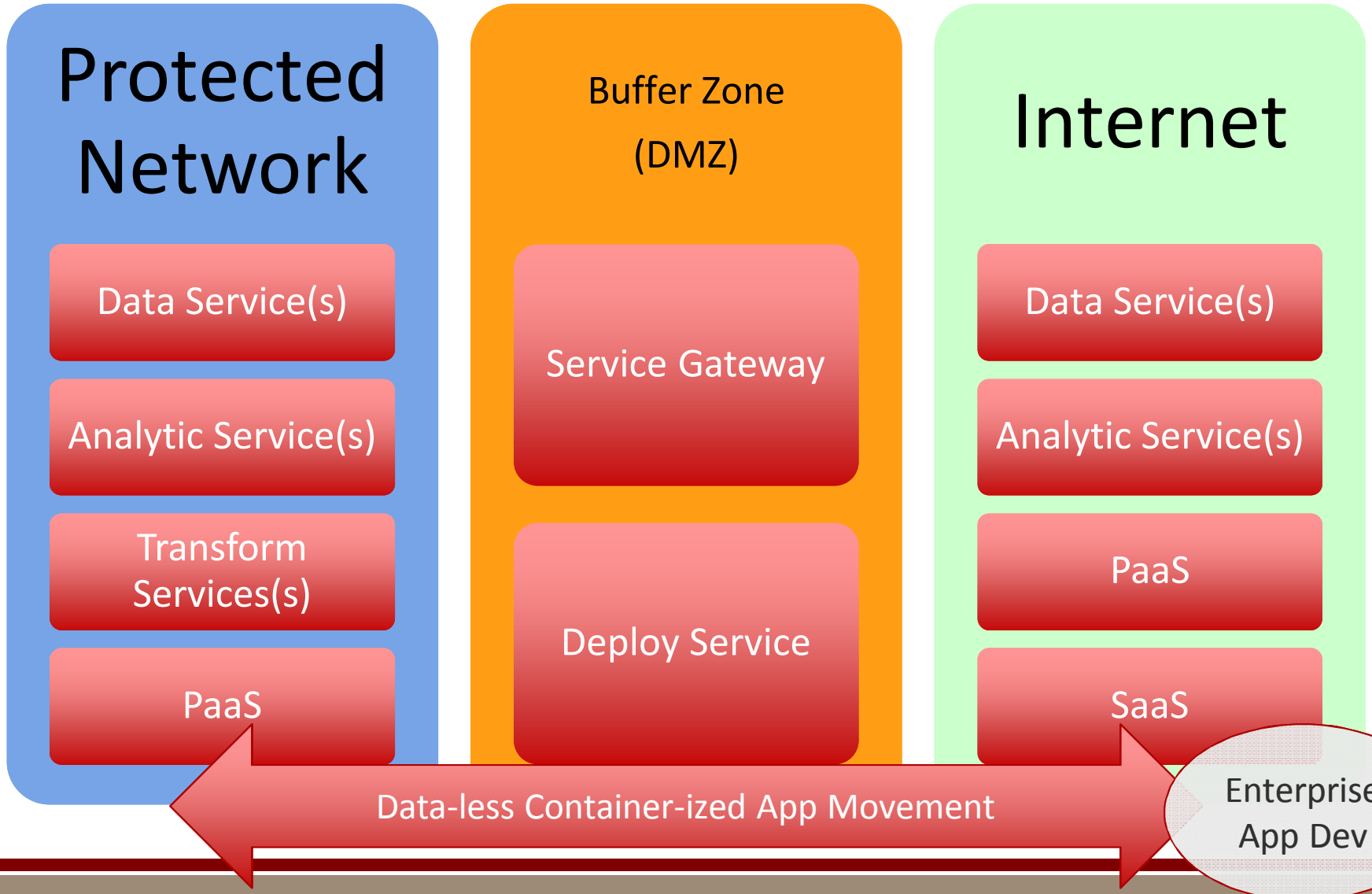


The Goals from using these Strategies:

- Increase the productivity of the Ent App Developer
- Reduce Time-to-Solution (TtS) , Atomic services used by other needs
- Reduce the switching cost for moving solutions based on business need
- Provide industry capabilities to developers:
  - encryption at rest & transport, high availability 24x7, and programmable elasticity



Systematic Vision



Example Opportunity

- Human Resource Management
  - Create atomic data sources with CRUD services: Who, What, When
  - Uses diverse analytics
- Wolfram Alpha like (similar to PeopleSoft Weblets Arch)
  - Development and acquisition of of atomic analytics
    - Each capable of being cast on different data sets
  - Acquisition and vetting of datasets
    - Each owned by independent data Stewarts from independent sources
- In a cloud enabled enterprise networked
  - All stakeholder groups could contribute atomic analytics including vendors
  - All Data Stewarts can supply the independent appropriately authenticating service of record.

Three Testing/PoC Methods, of Many Possible

- App Streaming
  - http://aws.amazon.com/appstream/
  - Build remotely and test/demo just screen bits
- Code synchronizing
  - http://aws.amazon.com/s3/
  - S3 to Cloudfront CDN
  - Git Hosting …
- Service brokering (api gateway model)
  - PeopleSoft RESTful APIs
  - Create restful services that can be abstracted by internal gateways that have security and usage polices
  - Allows for proof points that can be moved inside and start working after a single redirect
- All of these support the principle of getting the project team the best environment to innovate in.