Pivotal CF

Building Cloud ready apps

What Platform Operators should know

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The limitations of traditional apps

Scalability

Inter-Dependency

Platform Specificity

Location Specificity

Resiliency

Traceability / Logging

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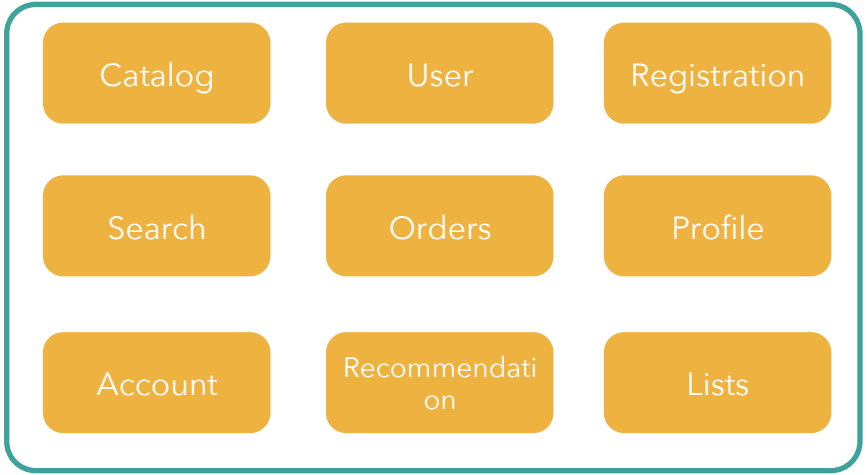
Scalability

- Traditional applications have been modeled as monolithic due an easy deployment model
- Several services are combined into one massive single application
- This model leads to a poor use of resources when it comes to scaling out your application
- Greedy components steal resources from others that are collocated with them



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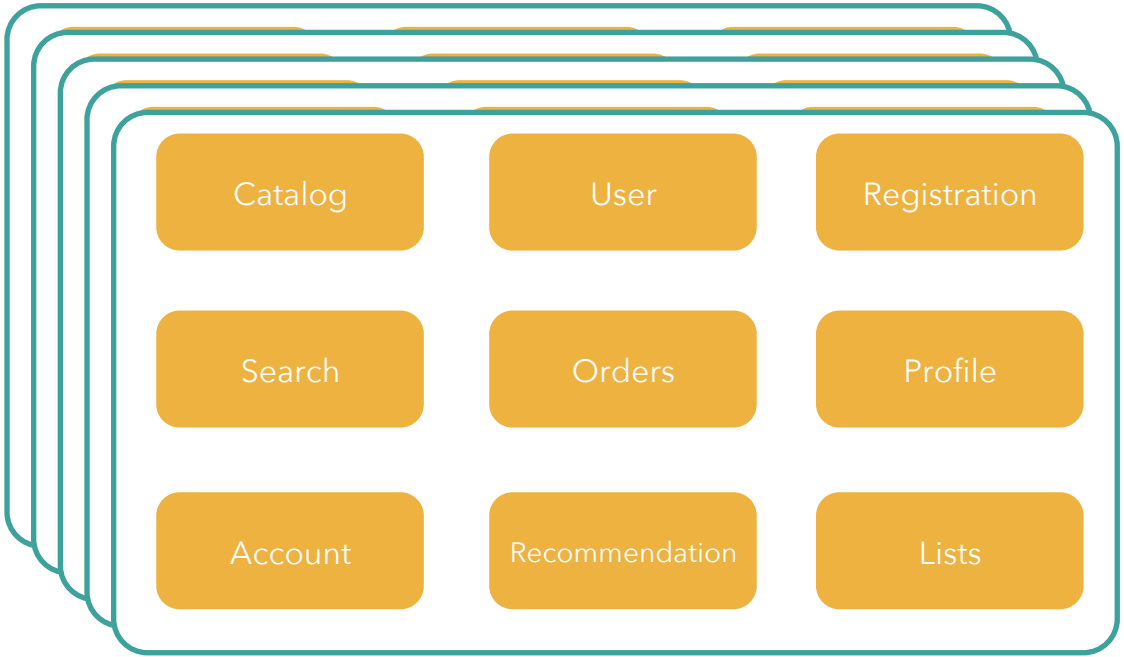
Scaling monolithic apps



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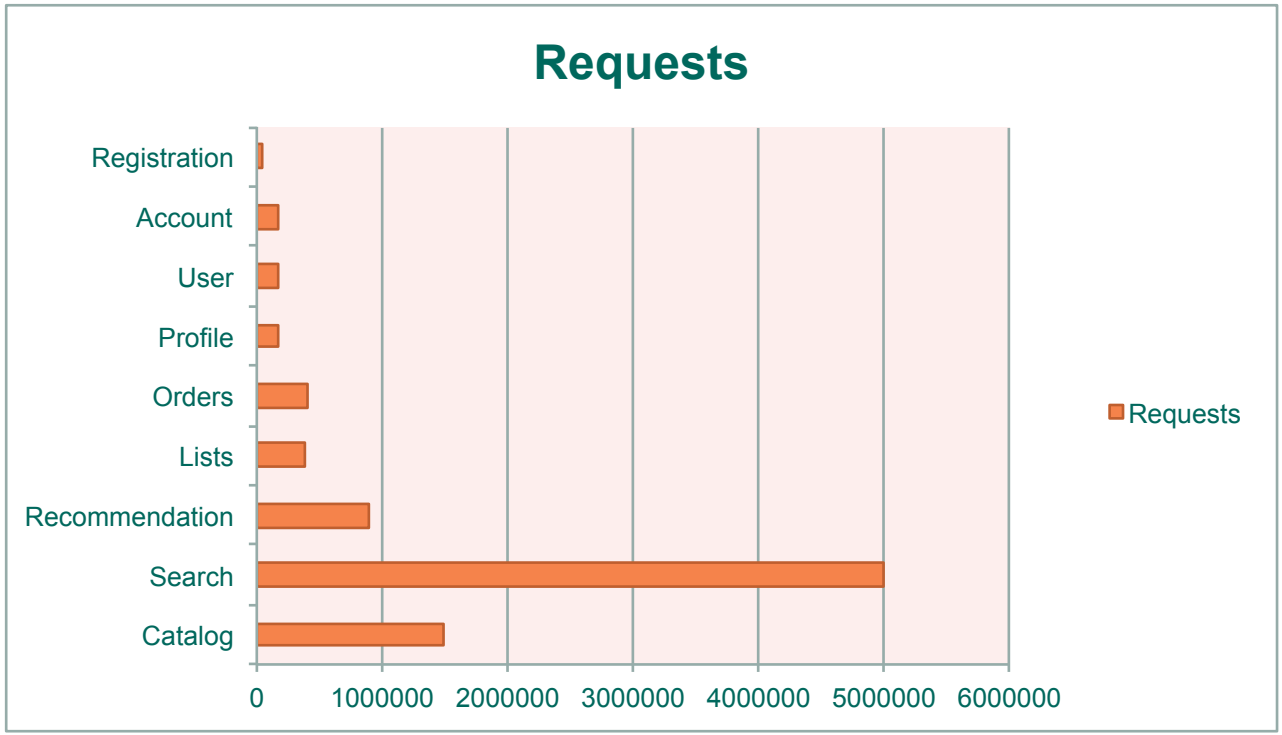
How you should scale



Location Specificity : Writing to disk

- Applications often need to write to disk, this includes form uploads with binary data, or content in most CMS systems
- Containers are short lived and not guaranteed to be executed on the same hardware every time they are needed to restart. Depending on a local file system is a big lock dependency some applications impose on the runtime
- This is one of the first issues to question or address when starting a conversation around new applications or selecting candidates to execute in PCF
- Some CMS vendors support usage of a service such as S3 to be the persistent mechanism of choice

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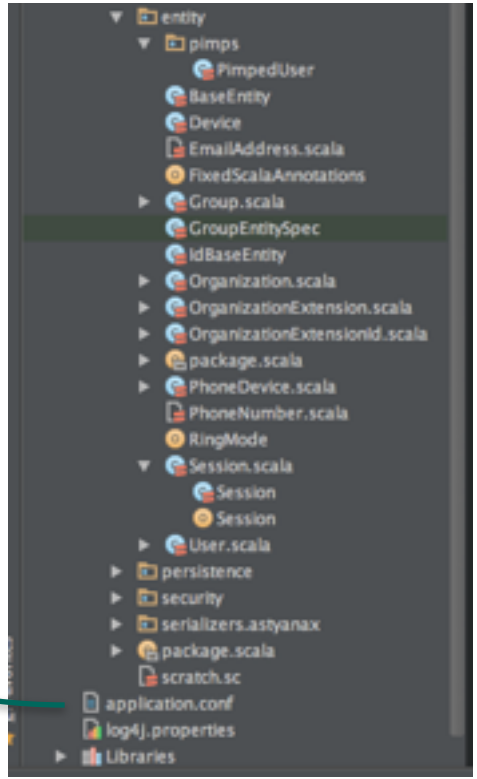
Location Specificity : service locations

```
Cache.hosts=10.68.27.41,10.68.27
.42

#naming does not help either
Cache.hosts=cacheserver1,
cacheserver2
```

Properties file deployed
With application



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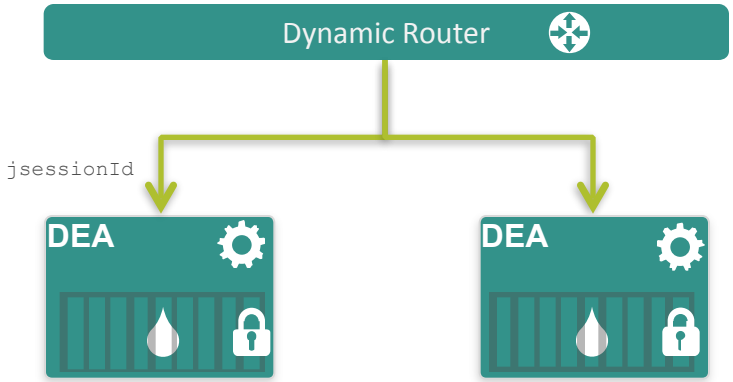
Location Specificity : Sticky sessions

- Applications that rely on session stickiness are subject to lead to unexpected behavior in case of failure of the node that contains that data
- Most web applications that use sessions do not have a replication strategy in place
- Your application availability is subject to a single node (even if you LB the load over other nodes)
- Some app servers use P2P session replication which can be very costly on large deployments



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The limitations of traditional apps

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Resilience

- No graceful shutdown in case of catastrophic events
- No recovery when the process executing the application dies
- No horizontal and automatic scale under heavy load
- No fallback mechanisms when dependent services are broken

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The limitations of traditional apps

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Traceability / Logging

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Traceability / Logging

- Traditional apps usually write logs to files on disk
- When you have a cluster composed of several instances, it becomes really hard to trace log files spread across different locations

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3rd Platform Strategies

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Better 3rd Platform Strategies

Local Disk Storage

Embedded Services

Session Replication

Logging

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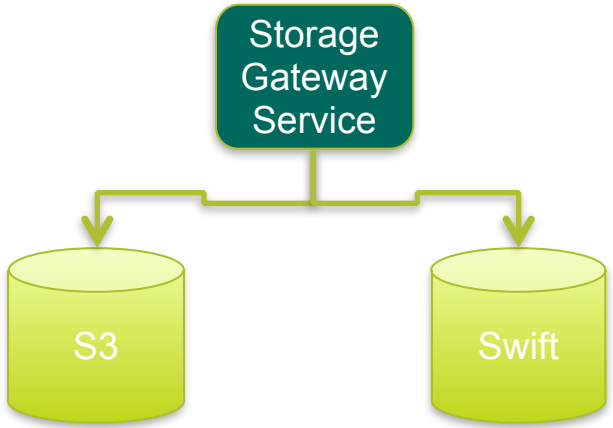
Local disk storage

- Use an storage gateway service instead of relying on plain old file system access
- This abstracts the need of a local file system while giving your application a flexible mechanism to rely depending on it's runtime (local on your dev, S3 or swift on prod)



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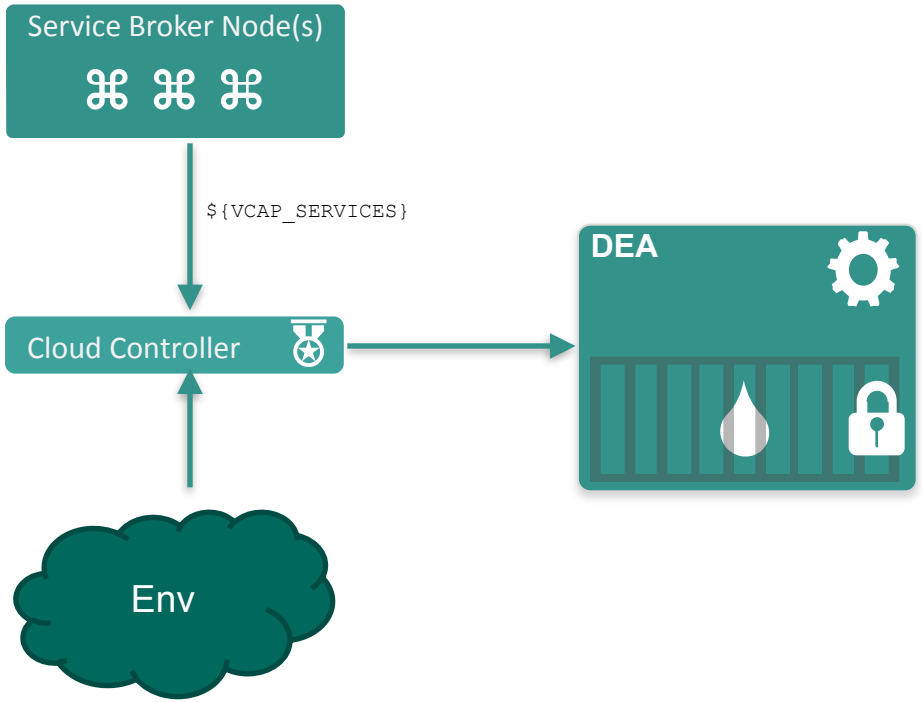
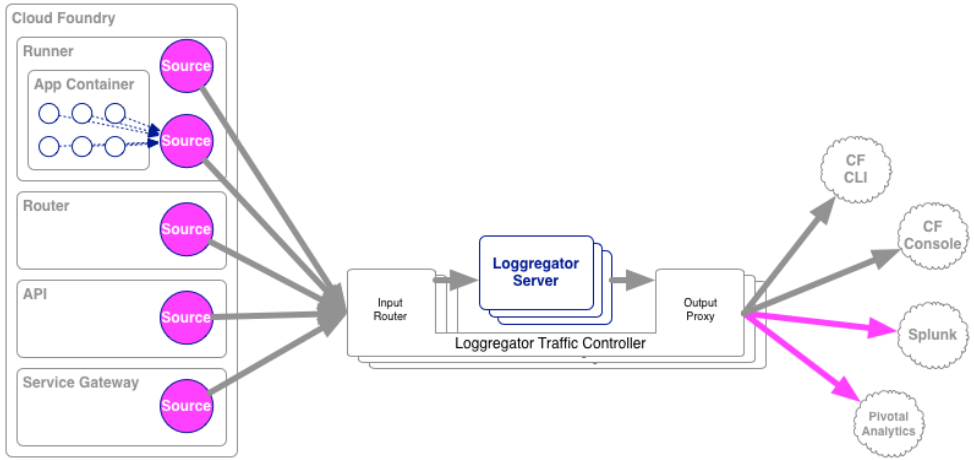
Embedded services

- Let the runtime inject any service reference through environment variables
- Reduces **location specificity** of the application
- Allows **disposability** of containers
- Runtime should **inject** any **variable** into the container



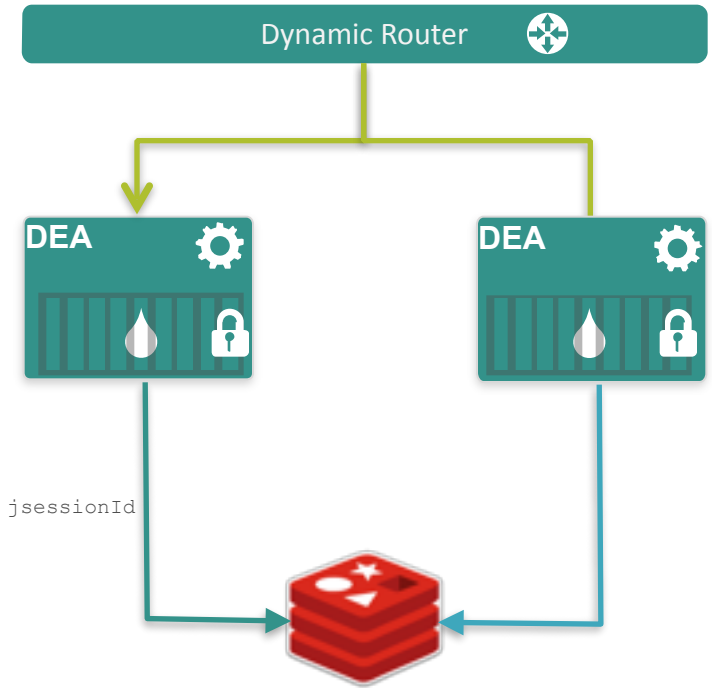
Logging

- Do not write to log files
- Output logs to console and use a syslog drain to collect all logs



Session replication

- The java buildpack supports redis session replication
- Sessions are now stored on redis, and in case of a node failure, the client state can still be found on a second node



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3rd Platform Realities

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Paying for your lunch…

- Significant Operations Overhead
- Substantial DevOps Skills Required
- Implicit Interfaces
- Duplication of Effort
- Distributed System Complexity
- Asynchronicity is Difficult!
- Testability Challenges

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Paying for your lunch…

- **Significant Operations Overhead**
- **Substantial DevOps Skills Required**
- Implicit Interfaces
- Duplication of Effort
- **Distributed System Complexity**
- Asynchronicity is Difficult!
- **Testability Challenges**

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Significant Operations Overhead

- Mitigate polyglot language/environment provisioning complexity via CF Buildpacks
- Mitigate failover and resilience concerns via CF Scale, CF Health Monitor, and future CF App AZ's (http://blog.gopivotal.com/cloud-foundry-pivotal/products/the-four-levels-of-ha-in-pivotal-cf)

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- Mitigate routing/load balancing and plumbing concerns via CF Router and CF Services
- High quality monitoring = CF BP agent-based tooling, future CF metric streams
- High quality operations infrastructure = CF BOSH!

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- Mitigate routing/load balancing and plumbing concerns via CF Router and CF Services
- High quality monitoring = CF BP agent-based tooling, future CF metric streams
- High quality operations infrastructure = CF BOSH!
- Robust release/deployment automation = CF API, scriptable CF CLI, Maven/Gradle Plugins, Strong Cloudbees/Jenkins partnerships

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Substantial DevOps Skills Required

- This is a **Good Thing™** in any architecture!
- CF keeps your microservices up and available (and your monoliths too!)
- CF = development and production parity!
- Polyglot persistence without all the fuss: CF BOSH and Service Brokers

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Distributed System Complexity

- Agreed: Microservices imply distributed systems.
- All of the CF platform features we've discussed help to mitigate these concerns:
  - latent/unreliable networks
  - fault tolerance
  - load variability

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Testability Challenges

- With CF, it is ***NOT*** difficult to recreate environments in a consistent way for either manual or automated testing!
- Idiomatic Microservices involves placing less emphasis on testing and more on monitoring
  - Not sure where this idea comes from…
  - CF is an enabler of both!

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A NEW PLATFORM FOR A NEW ERA