



Capital One's Cloud Journey: To Containers and Beyond

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Experience in:

- **Enterprise IT shops,**
- **Enterprise software**
- **Global consultancy**
- **Venture capital**

Named a “Top Ten Influential Person in Cloud Computing” by Wired.com

Author/Co-author of five books on virtualization/cloud computing including “AWS for Dummies”

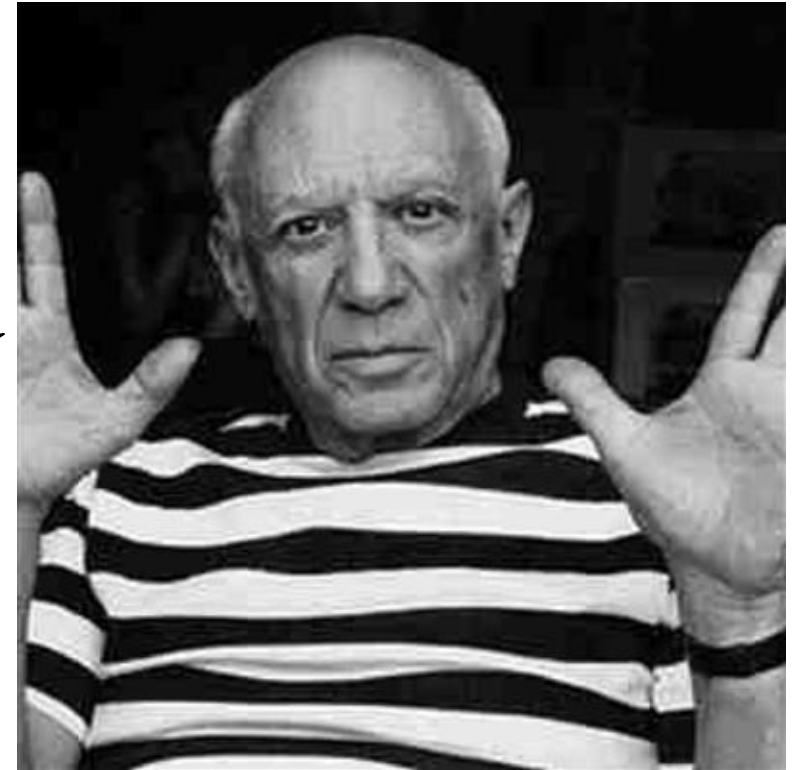
@bernardgolden





- **25 years old, founder led**
- **Full line bank**
 - **Credit cards, auto finance, retail and commercial**
- **~\$30B revenues, ~\$2B profits**
- **A tech company offering financial services**
- **All-in on public cloud**

**“Good Artists Copy
Great Artists Steal”**



**Benchmarking
Capital One:
30+
Interviews**

- **End Users**
- **Analysts**
- **Vendors**
- **Investors**
- **Industry Contacts**



**“Enterprises come to us and ask:
How can we be more like Capital One?”**

The Capital One Technology Landscape

Our Technical Peers



Spotify®

NETFLIX



Our Enterprise Commitments



Cyber



Enterprise
Services Risk



Cloud-Native



Not Drawn to Scale

CLOUD-NATIVE AND CONTAINERS

Cloud-Native Observations

- **Data center is the new factory**
- **Efficiency in manufacturing is key to success**
- **Agile, DevOps, SRE table stakes**
- **Talent and cognitive load is the limiting constraint**
- **Open source and managed services is the new supply chain**
 - Open source: accessible, malleable, free (as in puppy)
 - Cloud services: offloading low-value technical work

Containers: Execution Efficiency

- **Quick instantiation and teardown**
- **Higher server utilization**
- **Specialized operating systems and hypervisors**
- **Added benefits:**
 - Small attack surface
 - Sharable across SDLC

K8s: Application Efficiency

- **Declarative deployment**
- **Automated redundancy and resiliency**
- **Aligned with application partitioning aka microservices**
- **Portable (?) across clouds**
 - Small attack surface
 - Sharable across SDLC
- **Capital One pursuing via Critical Stack acquisition**
- **Too large a cognitive load for application groups**

Service Mesh: Operations Efficiency

- **A critical emerging area of focus**
- **Istio, Envoy center of gravity**
- **CNCF: An embarrassment of riches: many (too many) options, but:**
 - Istio, Envoy center of gravity
 - eBPF for performance
- **The role of managed K8s, e.g., Fargate**
- **The purview of “enterprise” architects and operations/SRE**
- **Even cloud-native organizations need less cognitive load**
- **A crying need for reference architectures**

Conclusion

- **Capital One the forerunner of enterprise container/K8s/service mesh adoption**
- **Containers/K8s the de facto standard for lightweight execution environment**
- **Service mesh the emerging frontier**
- **Cognitive load of complex environments an underappreciated factor in success**