



**CLOUD NATIVE
COMPUTING
FOUNDATION**

A Brief History of the Cloud

Dan Kohn, Executive Director

Cloud Native Computing Foundation

- Founded December 2015
- Non-profit, part of the Linux Foundation
- Initial projects are Kubernetes, donated by Google, and Prometheus, originally from SoundCloud
- Platinum members:



- Plus 40 additional members



A Brief History of the Cloud

Non-Virtualized Servers: Sun (2000)



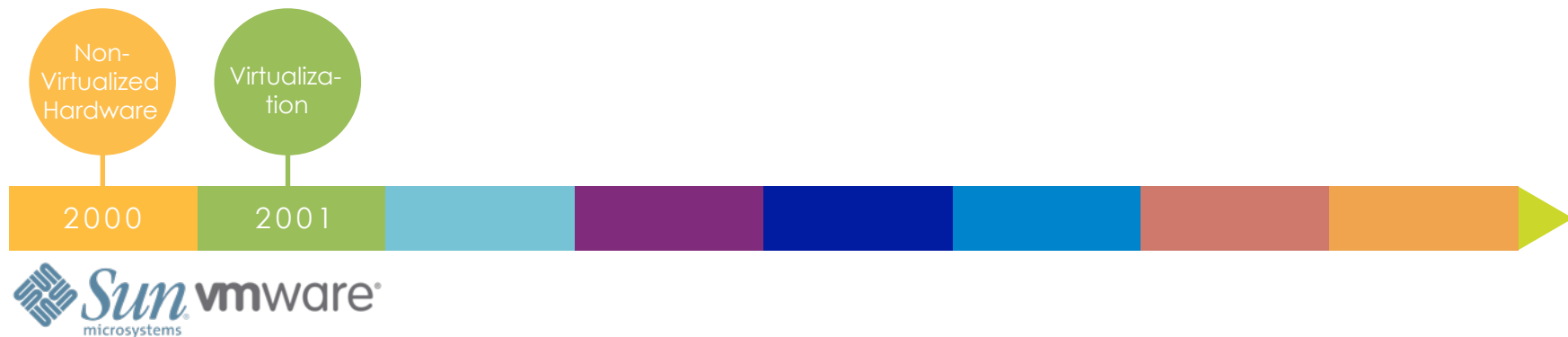
- Launching a new application? Buy a new server; or a rack of them!
- Building block of your application is physical servers



Virtualization: VMWare (2001)

vmware®

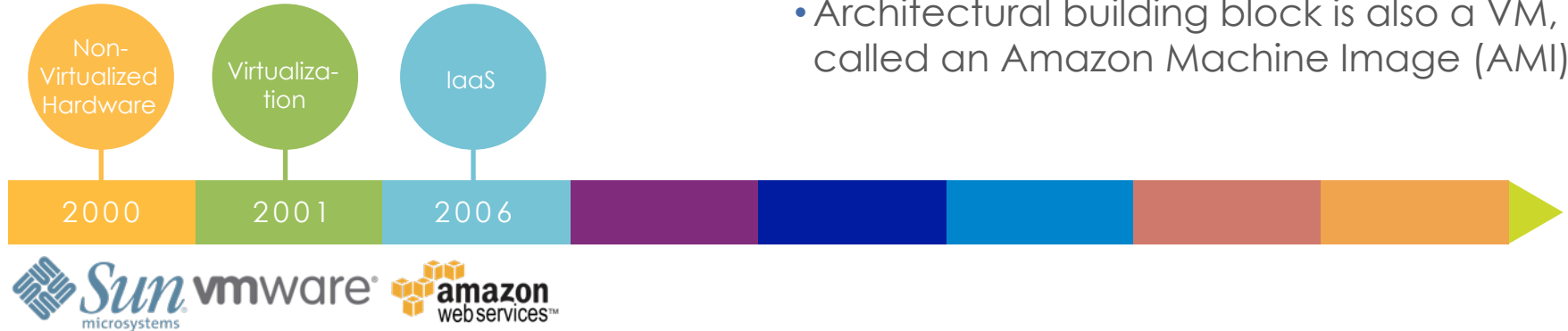
- Releases for server market in 2001
- Popularizes virtual machines (VMs)
- Run many VMs on one physical machine, meaning you can buy less servers!
- Architectural building block becomes a VM



IaaS: AWS (2006)



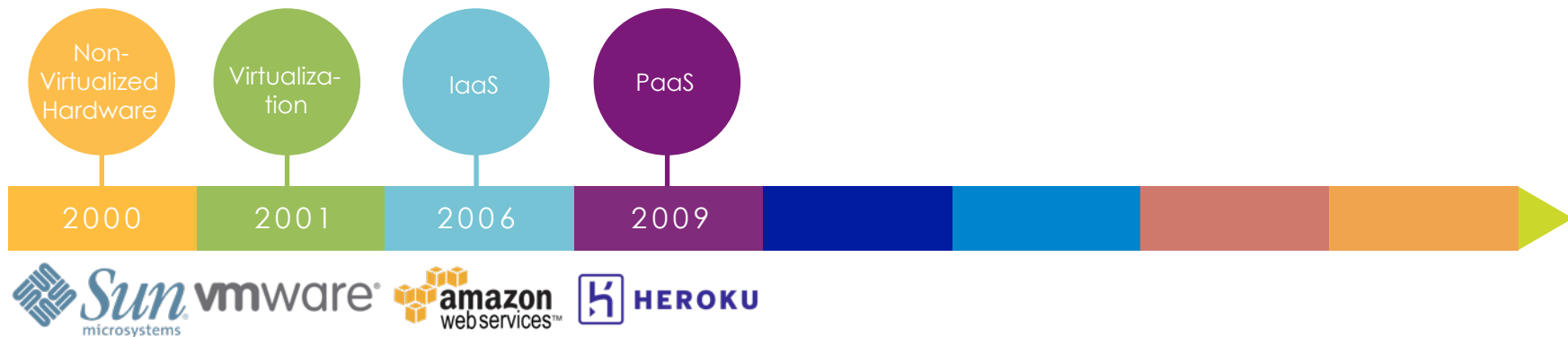
- Amazon Web Services (AWS) creates the Infrastructure-as-a-Service market by launching Elastic Compute Cloud (EC2) in 2006
- Rent servers by the hour
- Convert CapEx to OpEx
- Architectural building block is also a VM, called an Amazon Machine Image (AMI)



PaaS: Heroku (2009)



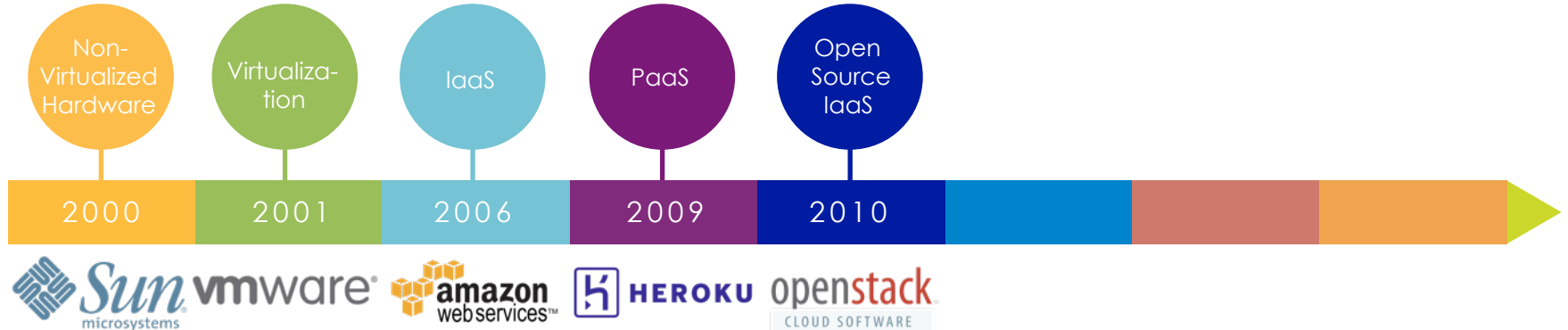
- Heroku popularizes Platform-as-a-Service (PaaS) with their launch in 2009
- Building block is a buildpack, which enables containerized 12-factor applications
 - The process for building the container is opaque, but:
 - Deploying new version of an app is just: `git push heroku`



Open Source IaaS: OpenStack (2010)



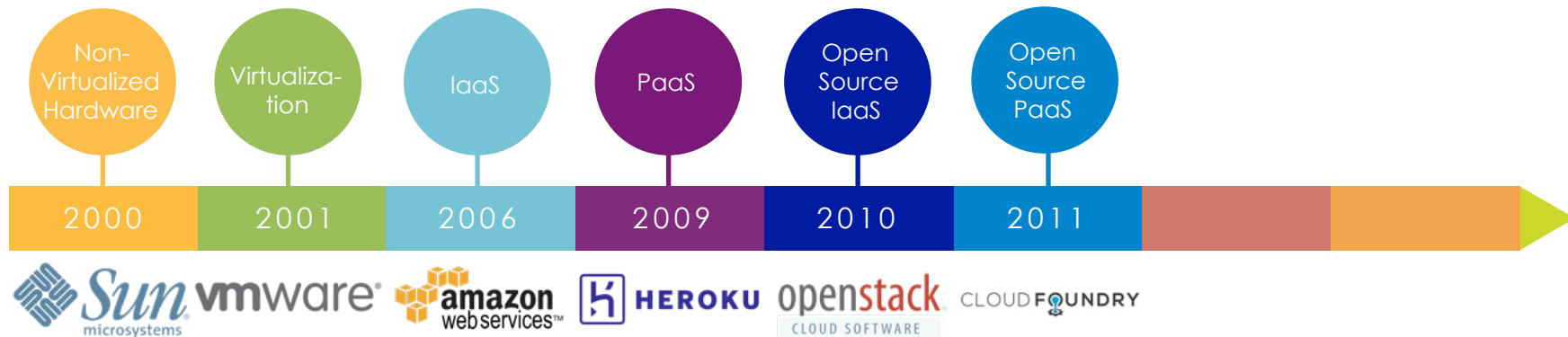
- OpenStack brings together an extraordinarily diverse group of vendors to create an open source Infrastructure-as-a-Service (IaaS)
- Competes with AWS and VMWare
- Building block remains a VM



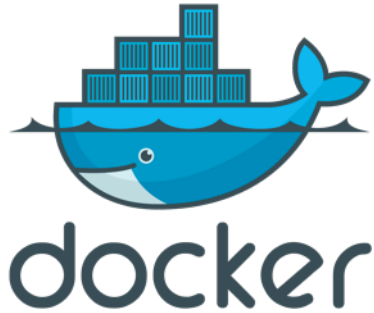
Open Source PaaS: Cloud Foundry (2011)

CLOUD FOUNDRY

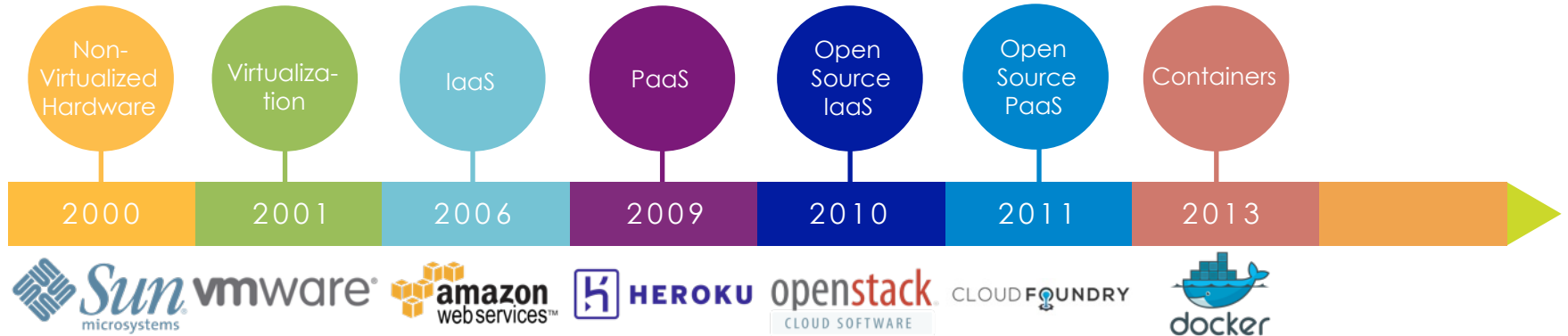
- Pivotal builds an open source alternative to Heroku's PaaS and launches the Cloud Foundry Foundation in late 2014
- Building block is Garden containers, which can hold Heroku buildpacks, Docker containers and even non-Linux OSes



Containers: Docker (2013)



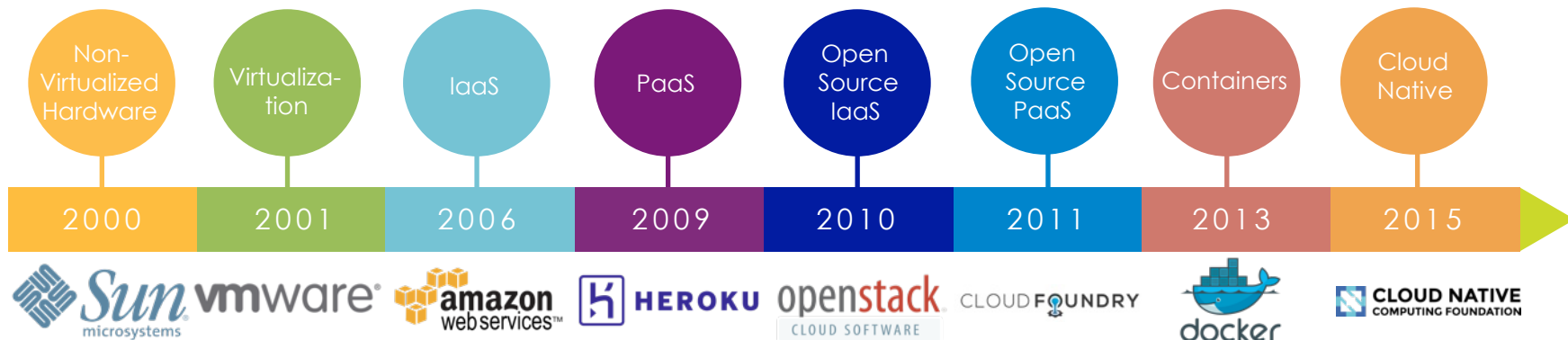
- Docker combines LXC, Union File System and cgroups to create a containerization standard adopted by millions of developers around the world
- Fastest uptake of a developer technology ever
- Enables isolation, reuse and immutability



Cloud Native: CNCF (2015)



- Cloud native computing uses an open source software stack to:
 - segment applications into *microservices*,
 - packaging each part into its own *container*
 - and dynamically *orchestrating* those containers to optimize resource utilization



What Have We Learned?

- Core Building Block:
 - Servers ➡ Virtual Machines ➡ Buildpacks ➡ Containers
- Isolation Units
 - From heavier to lighter weight, in spin-up time and size
- Immutability
 - From pets to cattle
- Provider
 - From closed source, single vendor to open source, cross-vendor

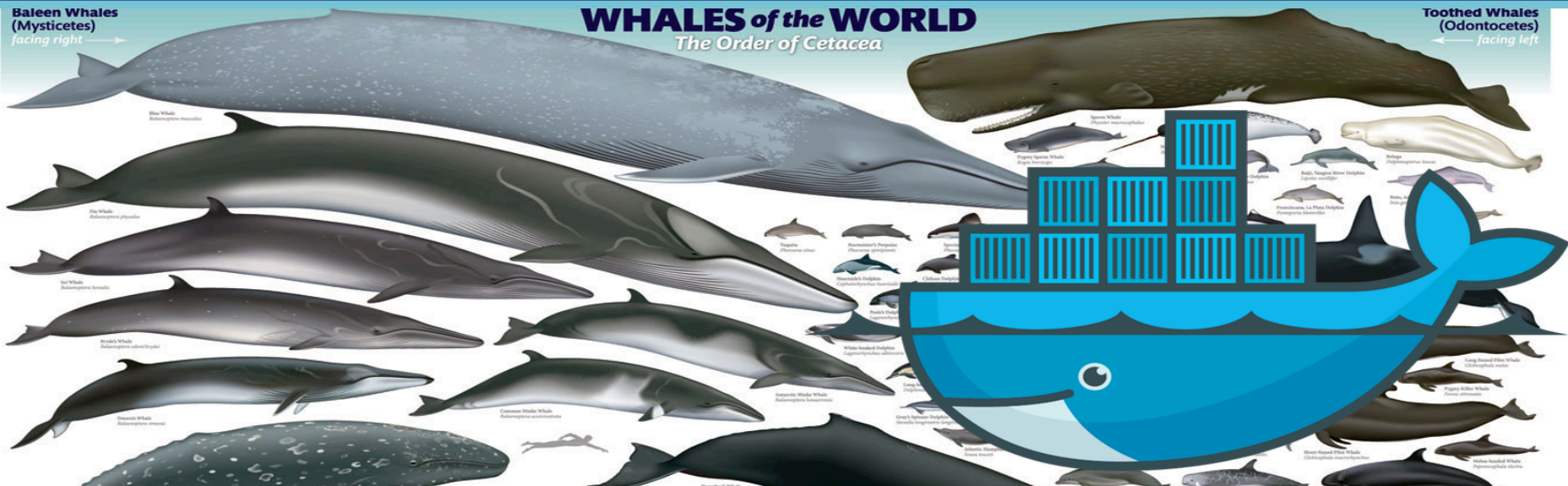
What About PaaS?

- OpenShift, Huawei CCE, Deis, and Apprenda are examples of PaaS's built on top of cloud native platforms
- Many new applications start out as 12-factor apps deployable on a PaaS
 - In time they sometimes outgrow PaaS
 - And some apps never fit a PaaS model
- PaaS on top of cloud native supports both



Cloud Native Value Propositions

Isolation



Container packaged applications achieve dev/prod parity, foster code and component reuse and simplify operations



No Lock-in



Open source software stack enables deployment on any public or private cloud (or in combinations)

Unlimited Scalability

Optimized for modern distributed systems environments capable of scaling to tens of thousands of self healing multi-tenant nodes (e.g., Google starts 2 billion containers per week)



Agility and Maintainability



Are increased by splitting applications into microservices with explicitly described dependencies

Improved Efficiency and Resource Utilization



Via a central orchestrating process that dynamically manages and schedules microservices. This reduces the costs associated with maintenance and operations.

Resiliency

To failures of individual containers, machines, and even data centers and to varying levels of demand



RENA
MONROVIA



Hosting with the CNCF?

Software Foundations in a Post-GitHub World

- No one is impressed today by a software repo, mailing list, or website
- Foundations need to offer a different set of services
- CNCF's goal is to be the best place to host cloud native software projects

Why You Should Host Your Project at CNCF

- Neutral home increases contributions
- Endorsement by CNCF's Technical Oversight Committee
- Priority access to \$15 million, 1000 node Community Cluster
- Engagement with End User Board
- Full-time press relation and analyst relation teams
- \$20 K per year to improve your project documentation
- Maintain your committers; just agree to unbiased process
- Full-time staff eager to assist
- World-class events team, track at CloudNativeCon/KubeCon around the world, and custom events for your project
- Worldwide meetup groups and Cloud Native Roadshows
- Inclusion in the CNCF marketing [demo](#)

CNCF Potential Projects

- Potential future project spaces:
 - Tracing (OpenTracing, OpenZipkin)
 - Messaging (NATS)
 - Stream processing (Heron)
 - Logging (Fluentd)
 - Networking (Flannel, Calico, Weave, CNI)
 - Configuration (etcd)
 - RPC proxy (linkerd)
 - Protocol buffers (GRPC)
 - Naming (CoreDNS)
 - Database (CockroachDB)
 - Storage (Minio)



Get Involved

Help Set the Direction of Cloud Native

- Participate in our hosted projects and attend our events, meetups, and roadshows
- Design your applications and services to work with a cloud native platform of orchestrated containers of microservices
- Help accelerate adoption of this significant industry trend by becoming a member of the Cloud Native Computing Foundation

CNCF Events



CLOUD NATIVE CON
Seattle 2016

#CloudNativeCon
Nov 8-9, 2016

CloudNativeCon.org

JOIN US!



KubeCon
A CNCF EVENT

Seattle • Nov 8-9, 2016

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PrometheusDay
A CNCF EVENT

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CloudNativeCon.org

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CloudNativeCon/KubeCon/PrometheusDay Seattle Nov 8-9, 2016

CloudNativeCon/KubeCon/PrometheusDay Europe in April 2017

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