InterConnect 2016
The Premier Cloud & Mobile Conference

Taking the next hot mobile video game live with Docker and IBM SoftLayer

Scott Porter, Daniel Krook, Shaun Murakami

February 21 – 25
MGM Grand & Mandalay Bay
Las Vegas, Nevada

Agenda

Mobile video gaming on the cloud

- The video gaming market in 2016
- Typical mobile video gaming architecture

EA Firemonkeys workload characteristics

- Mobile video gaming workload profile and pre-cloud architecture
- Challenges and opportunities to leverage a new open cloud architecture

EA Firemonkeys cloud solution deep dive

- Containerizing application components with Docker
- Creating a DevOps pipeline for application deployment orchestration
- Performing service management and cluster configuration
- Improvements in performance, flexibility, and speed to market

About us

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Mobile video gaming on the cloud

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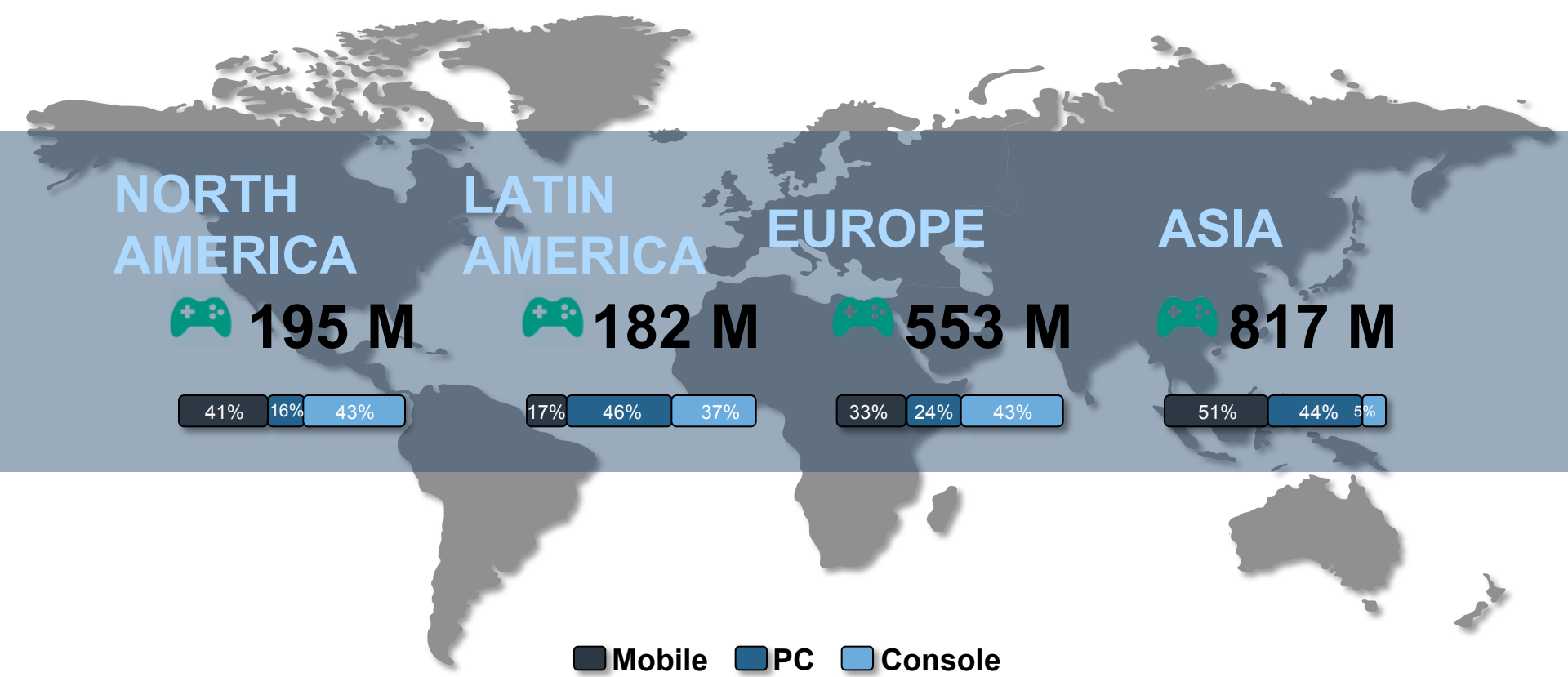
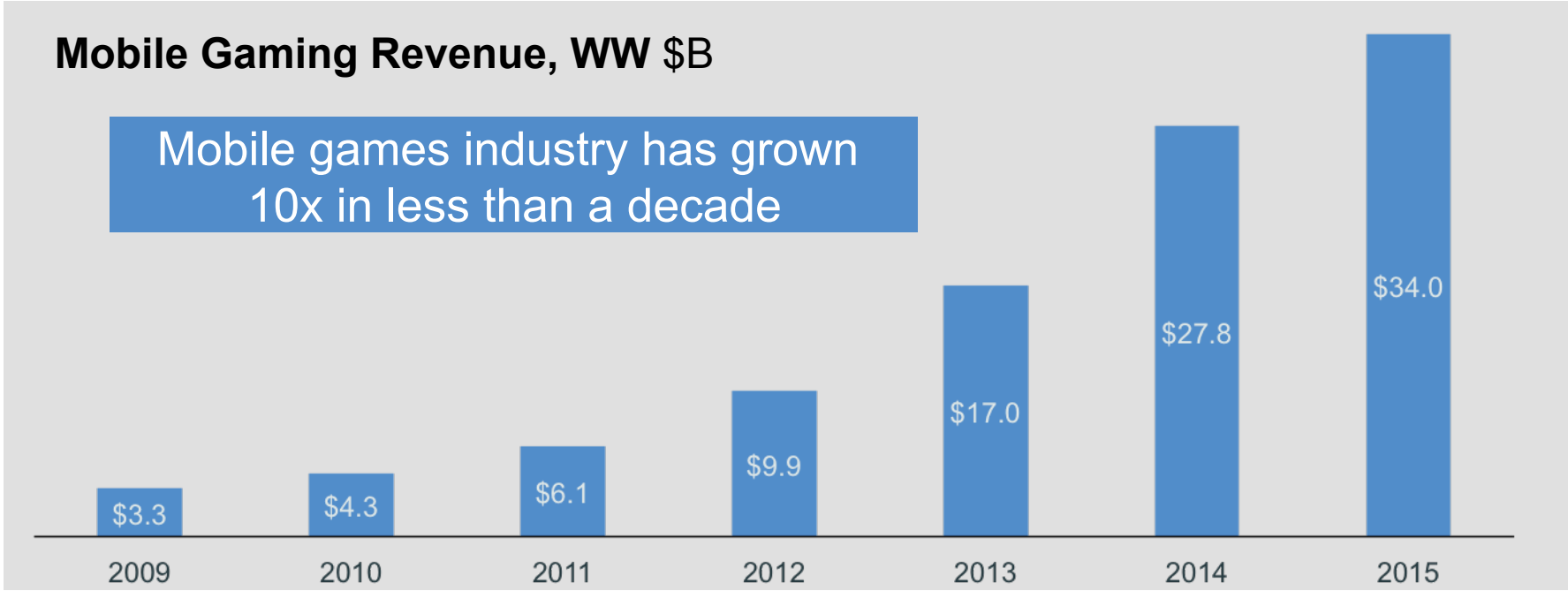
There are over a billion video game players worldwide



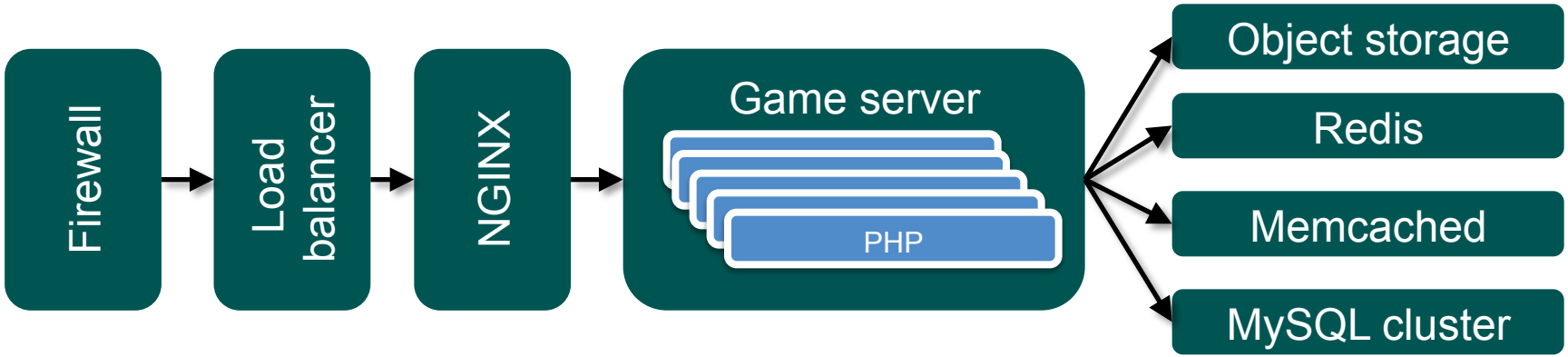
2015 est. Revenues Consist of Software Gaming Market

Mobile gaming is powering the next wave of growth



Typical mobile game server architectures

- Mobile gaming backends are very typical web applications
- Frequent updates to game content – infrequent updates to game engine
- Daily peak users of millions – hundreds of thousands simultaneously
- Need to scale-up/down around release and content pack releases
- Stateless frontends with memory caching and both SQL and NoSQL databases
- Growing use of analytics on user experience, recorded game telemetry, replays



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FIREMONKEYS

CLOUDCELL

EA

EA MELBOURNE FIREMONKEYS

EA Mobile studio based in Melbourne, Australia

Formed in 2012 from two EA Mobile studios, Iron Monkey and Firemint

Focused on developing the highest quality mobile titles

What do we do?

Mobile free-to-play live service games

Bi monthly client releases often with new connected features

Global market means no downtime, ever

What is Cloudcell?

Firemonkeys in house Client/Server Tech Stack

Mobile focused connected features

Originally developed by Firemint for Flight Control

CLOUDCELL

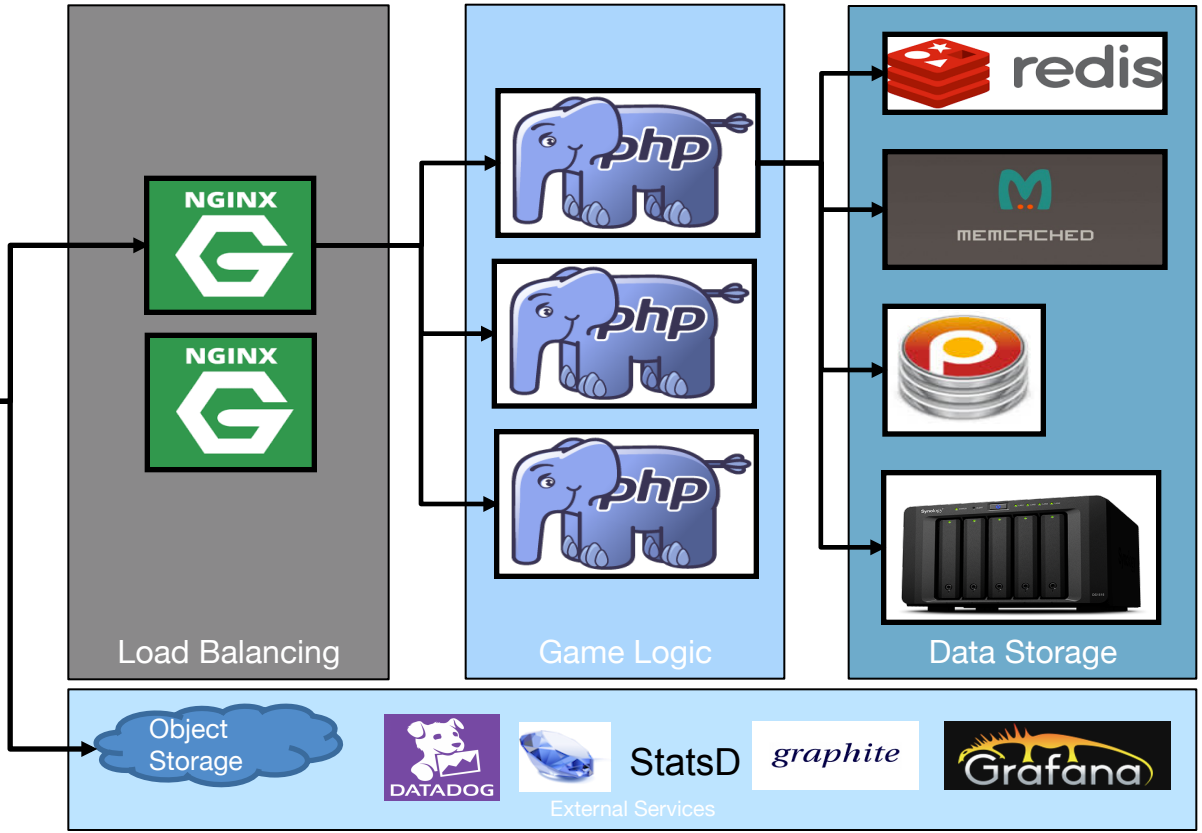
Cloudcell is integrated into all Firemonkeys live titles

We handle almost a billion requests a day

- 13.5k Peak Requests Per Second
- ~ 900M Requests Per Day
- ~ 100s of Thousands of Peak Concurrent Players
- Scalable to Millions of Daily Active Players
- > 100 TB Player Game Data
- > 170 Hosts (60 Live Hosts)
- Team of 8

CLOUDCELL

Firemonkeys Mobile Video Gaming Architecture



But there are several opportunities to improve operations

- Deployments are manual
- Orchestration is brittle, even with SaltStack

- For scalability we shard by title and provision for the peak expected load on new game features

Adopting Docker offers us several benefits

- Growing ecosystem with automated solutions
- Run anywhere simplifies scaling with VMs
- Easy transition, run side by side with existing stack and tightly manage risk

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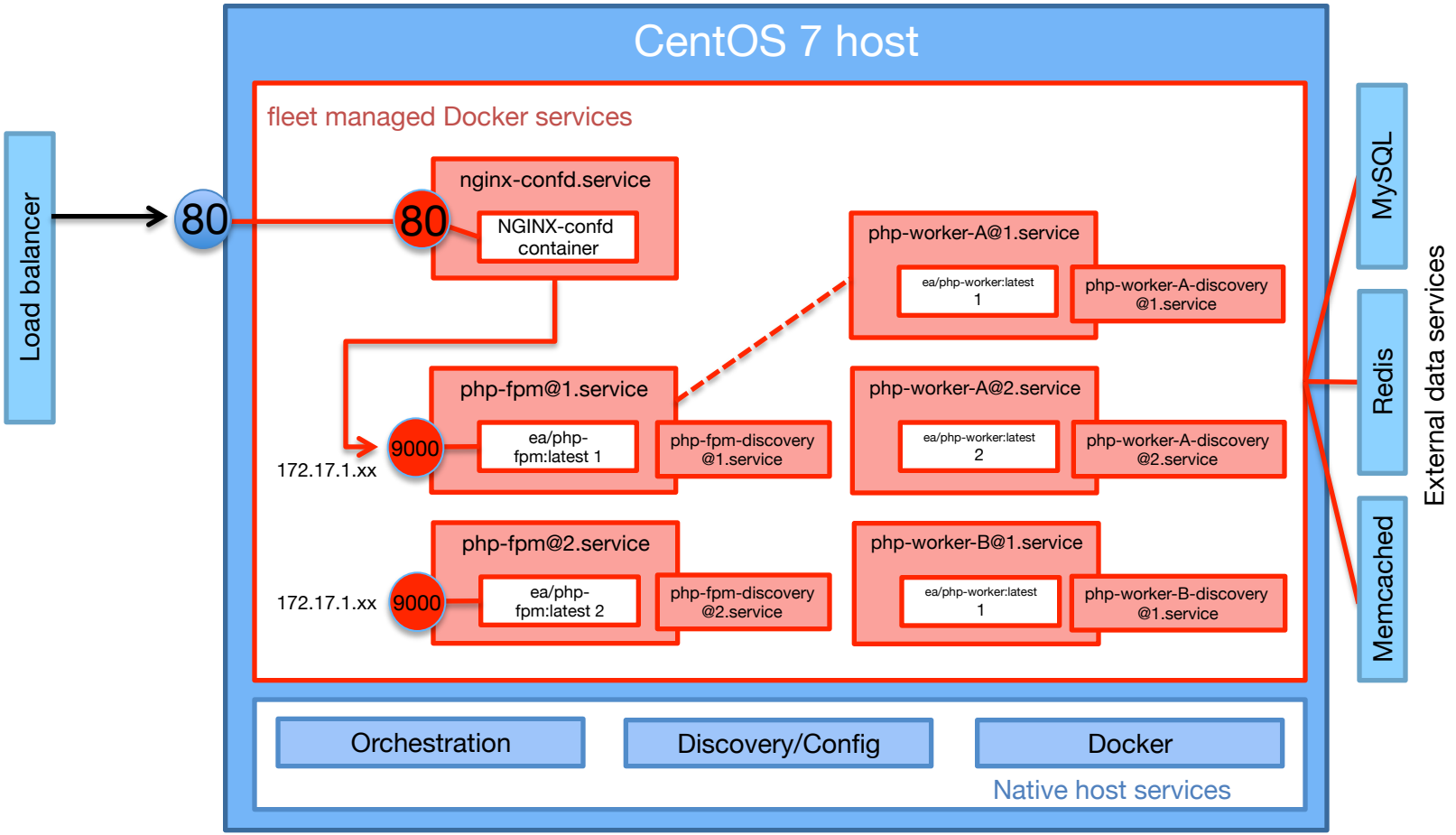
Packaging Cloudcell as Docker containers: Approach

- Focused on the Game Logic Layer
- Decomposition to MVP
  - Game Logic
  - Web Services (admin, database)
  - Workers
  - NGINX

Packaging Cloudcell as Docker containers: Decisions

- Generic containers helped simplify workers
- Run multiple *containers* - not *processes* - for simplicity, load distribution
- Patching live – trade-off between speed and traceability
- Orchestration limited to host

The new Docker enhanced deployment on SoftLayer



Orchestration is managed using fleet (a distributed init system)

- Unit files per service type
  - NGINX
  - Admin
  - Game logic
  - Each worker

  - Each service has a sidekick discovery process

Service management: Request, registration, and discovery

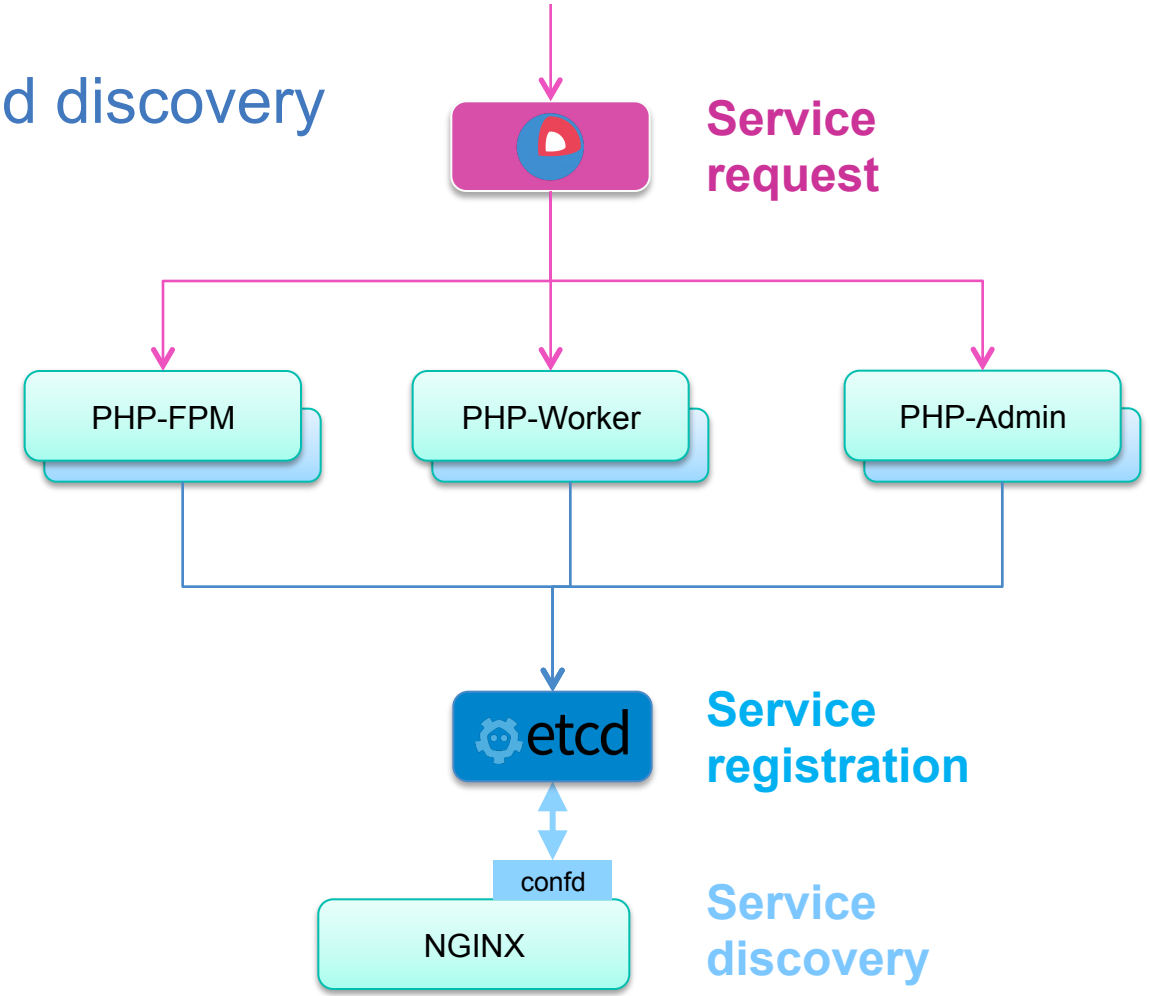
fleet – manages the lifecycle Of the Docker containers

Docker container

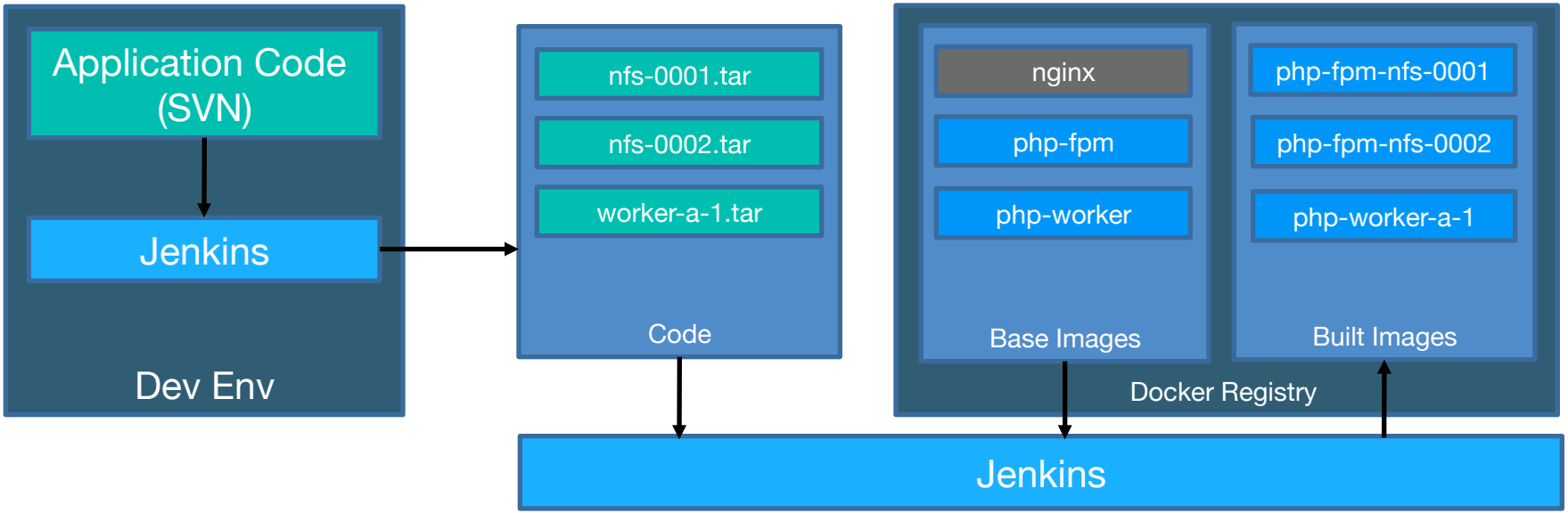
Sidekick process – monitors/ registers services

etcd – holds service registry and configuration

confd – Configures NGINX dynamically based on service discovery results



A pipeline builds releases and packages them as container images



Jenkins is used to execute build, deploy, and scale jobs

1. Jenkins ships code to build machine
2. Build machine builds and commits images to Docker private registry
3. Generates fleet configuration from templates
4. Executes fleet deployments
5. Executes scale requests


A Configuration Editor is used to manage and track deployments

- Simple management UI for Jenkins and fleet APIs
- Maps Cloudcell deployments to the state of each environment
- Maintains history of code promotions, status changes, error messages

Configuration, orchestration, and deployment pipeline

Configure topology, maintain state.

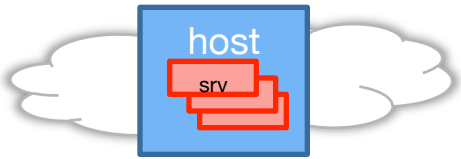
Cloudcell environment configuration

Need for Speed

File Storage PHP worker

	Environment	Release	NGINX	Admin	PHP	AB	FS	PST	PNE	PNG	PNS	RTT
Edit Detail	Development	6500	1	1	10	1	1	1	1	3	5	1
Edit Detail	Staging	6500	1	1	2	1	1	1	1	1	1	1
Edit Detail	Load test	6500	2	1	50	5	5	5	5	5	10	1
Edit Detail	Production	6199	2	1	50	5	5	5	5	5	10	2

Run containers in staging, load test, and production. Capture metrics.

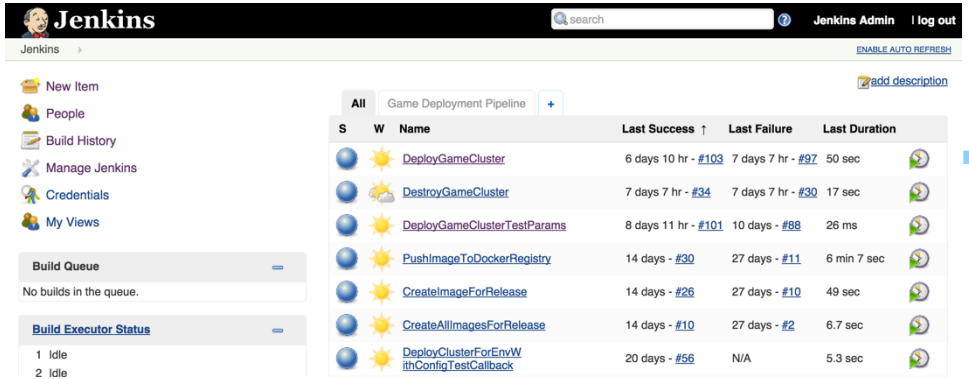


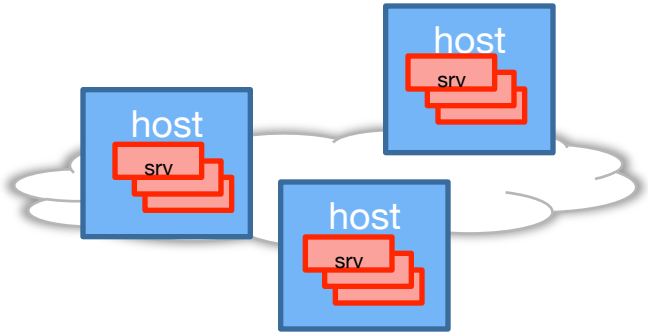
docker

fleet

etcd

Build images with code, deploy to or scale target environments.





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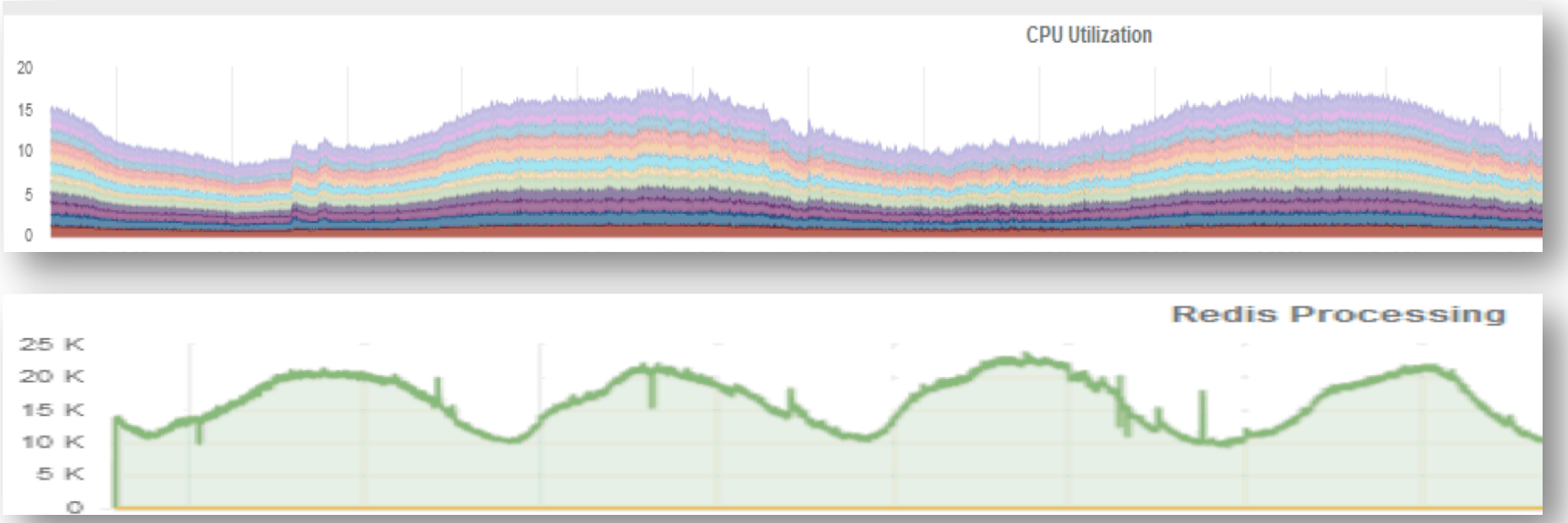
"Using IBM and Docker container solutions, we have been able to build a gaming platform that is massively scalable, highly performant and meets our deployment velocity needs."

What's next

Continue to migrate to microservices

Need container-centric monitoring for hundreds of containers



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