Footprint Optimization

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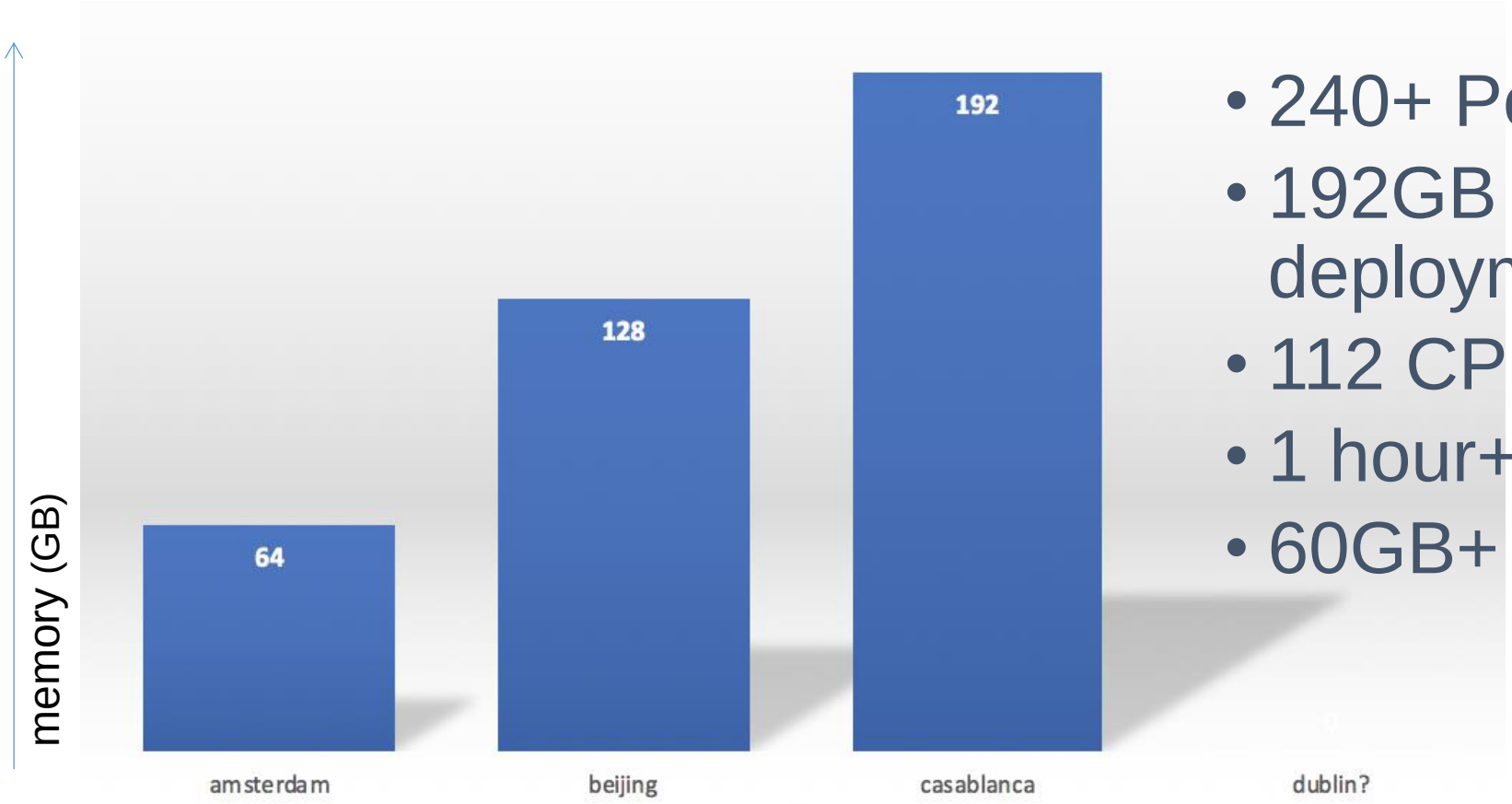
ONAP Resource Requirements

Casablanca largest release yet



- 240+ Pods
- 192GB memory for full deployment
- 112 CPUs
- 1 hour+ startup time
- 60GB+ (offline installer - Beijing)

Why do we care?

- Production-grade Deployments
  - Minimize time to instantiate when healing, scaling or migrating components
  - Limit impact of outages and upgrades
- Lower infrastructure costs
- Optimal use of resources in shared environments (i.e. Integration)
- Improved build times
- Fast deploy/update lends itself to automated integration tests
- Shorter develop-test-validate cycles accelerate innovation

What is being done?

- Application Resource Optimizations
- Normative Container Base Images
- Resource Limits
- Deployment Options
- Database Consolidation

Application Resource Optimizations

- A lot of containers rely on Java code
  - JVM size has a big impact on memory footprint
  - No sharing JVM memory between containers
- Heap tuning for Java-based containers is possible
  - -Xxms: for minimal heap size
  - -Xxmx: for maximal heap size
- Default Heap size defined can be defined in Helm Charts
  - Defined for most of containers
  - Some Heap size still hard-coded in DockerFile scripts and can not be optimized for small deployments

Application Resource Optimizations: JVM configuration in Helm Charts

```
config:
  cassandraUsername: root
  cassandraPassword: Aa123456
  cassandraJvmOpts: -Xmx2536m -Xms2536m
```

```
config:
  javaOptions: "-Xdebug … -Xmx1536m -Xms1536m"
  cassandraSslEnabled: "false"
```

```
config:
  heap:
    max: 512M
    min: 100M
  jvmOpts: -Dcassandra.consistent.rangemovement=false
```

Some Examples used for Cassandra

Application Resource Optimizations: recos

- Use JVM options in Helm Chart
  - To be used in environment variables when Running the Docker container
  - Can be overridden during deployment (e.g. using ENV variables)
  - Avoid conflict with resource limits
    - Java Memory Size = Heap size + Compiled code + Threads/GC data
    - Resource limit request to be aligned with these constraints
- Use Java 10+
  - Better integration with Docker
- Prefer Java framework springboot to reduce the memory

Application Resource Optimizations: define optional sub-component

- Every project embeds an increased number of containers
  - For some project, all sub-components are not mandatory to run a dedicated use-case
- Better documentation required to define the role of every container
  - Mandatory to run basic feature
    - Including all sub-components during the installation phase
  - Optional to run optional feature

Effect of Large Container Images

Images	Build time	Deployability
Large	Long	Low

ONAP Normative Container Base Images

Reduce Footprint

Support Multi-CPU Architecture

Improve Deployability

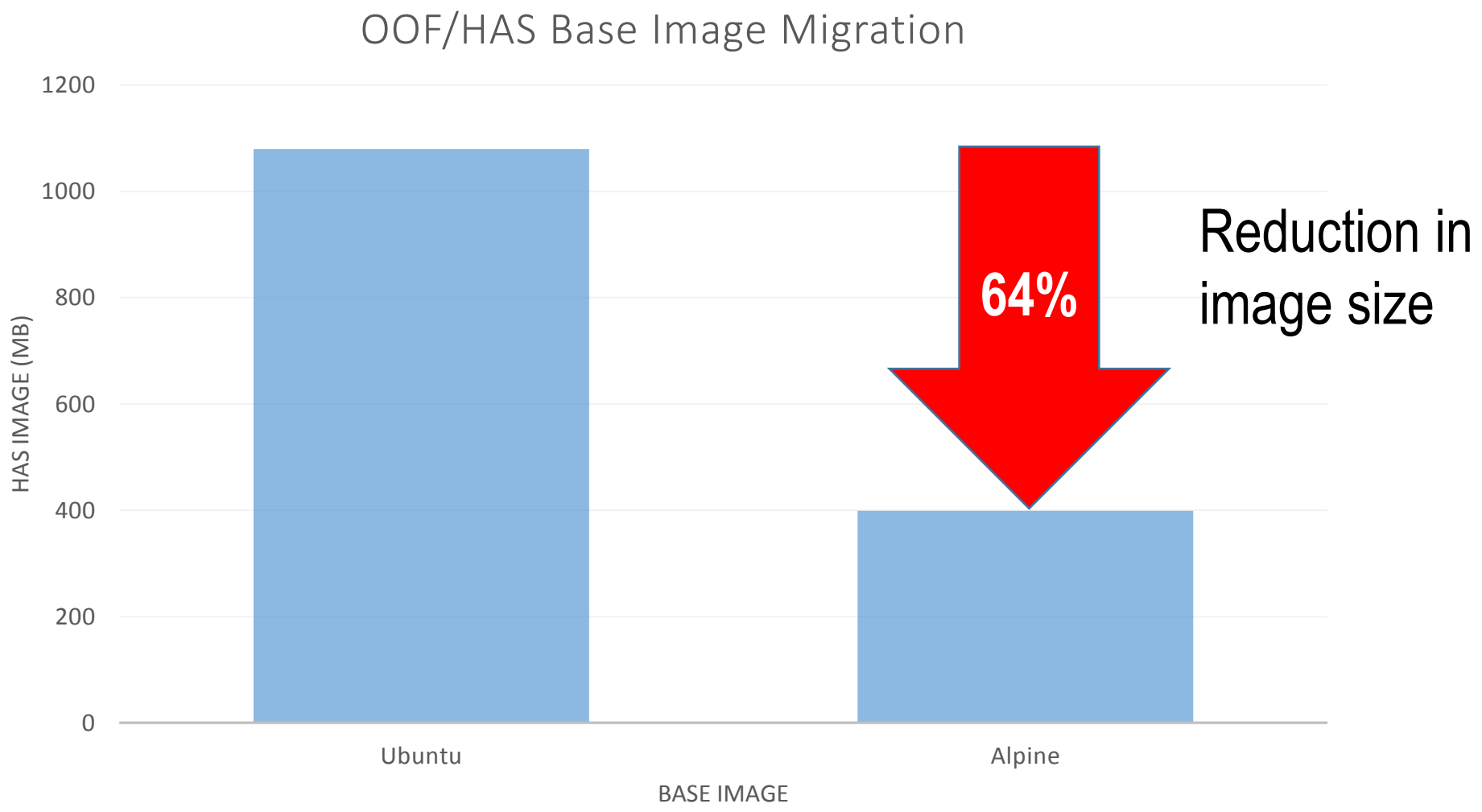
Alpine Base Images

Reduce Footprint

Support Multi-CPU Architecture

Improve Deployability

Effect of Migrating to ONAP Normative Images



Typical Changes to Dockerfile

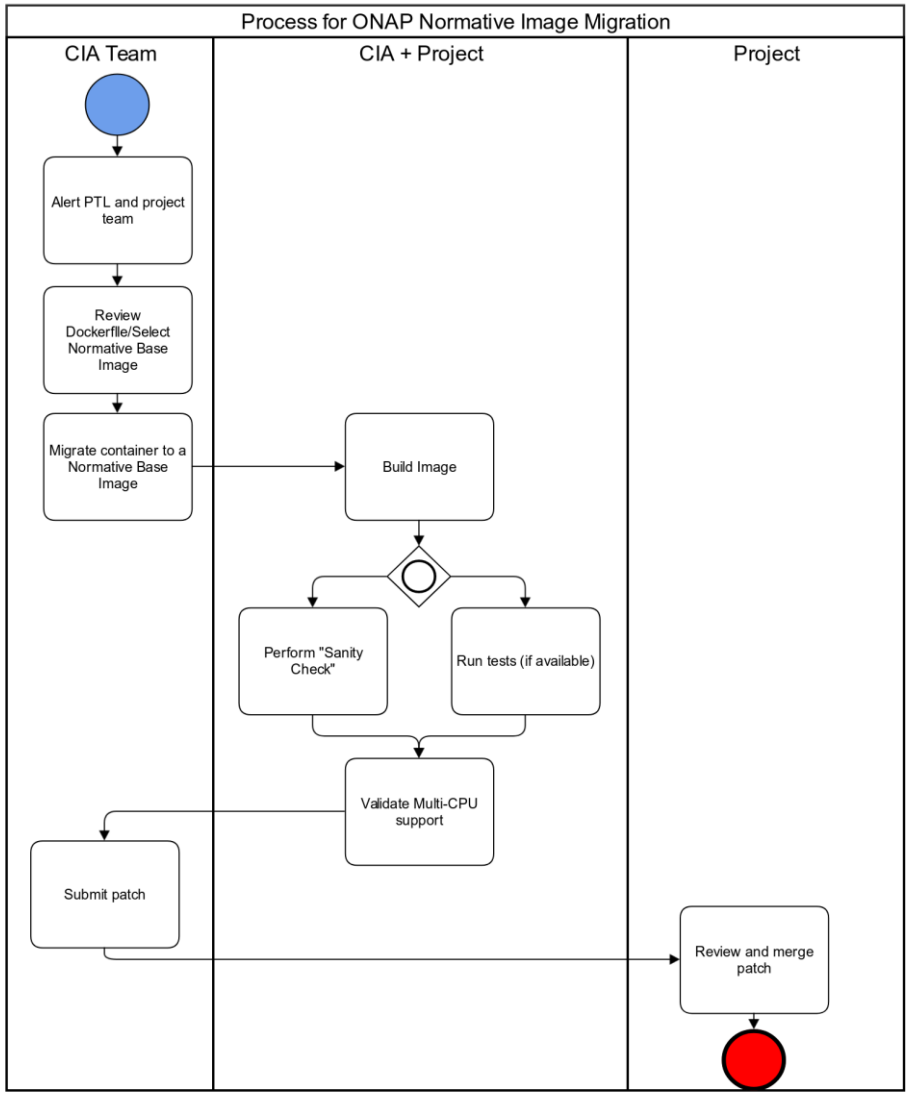
```
FROM python:2.7-alpine
.
RUN apk add --no-cache curl \
    gcc \
    libffi-dev \
    linux-headers \
    musl-dev \
    git \
    libxml2-dev \
    libxslt-dev \
    openssl-dev \
    py-setuptools \
    unzip \
    wget \
    xvfb
```

1. Base image

2. Package manager

3. Libraries

What to expect



CIA Resources

ONAP Normative Container Base Images

Project Engagement Process/Workflow

Dublin Scope

Resource Limits

- Introduced in Casablanca
  - improves pod scheduling
  - avoids excessive Pod evacuations
- Intention behind flavors:
  - small -> low resources for dev
  - large -> higher resources for production
  - unlimited = take what is needed
- Refinement needed in Dublin
- Ask for project teams to define and manage

```
#################################################################
# Global configuration overrides.
#
# These overrides will affect all helm charts (ie. applications)
# that are listed below and are 'enabled'.
#################################################################
global:

  # override default resource limit flavor for all charts
  flavor: unlimited
```

```
flavor: small

resources:
  small:
    limits:
      cpu: 2000m
      memory: 4Gi
    requests:
      cpu: 500m
      memory: 1Gi
  large:
    limits:
      cpu: 4000m
      memory: 8Gi
    requests:
      cpu: 1000m
      memory: 2Gi
  unlimited: {}
```

Deployment Options

Development

- development and functional testing only
- onap-dev.yaml
  - flavor: small - minimal resource allocation
  - no clustering (default chart configuration)
  - application-specific optimizations for dev and test

```
helm deploy dev release/onap –f onap-dev.yaml
```

Production

- larger resource allocation for deployments under load
- onap-prod.yaml
  - flavor: large - targets production deployment
  - clustering enabled for High-Availability and scaled for load
  - application-specific optimizations for prod and load

```
helm deploy prod release/onap –f onap-prod.yaml
```

Database Consolidation

Components that use the same database technology, can share a single cluster with separate schemas and credentials

Benefits:

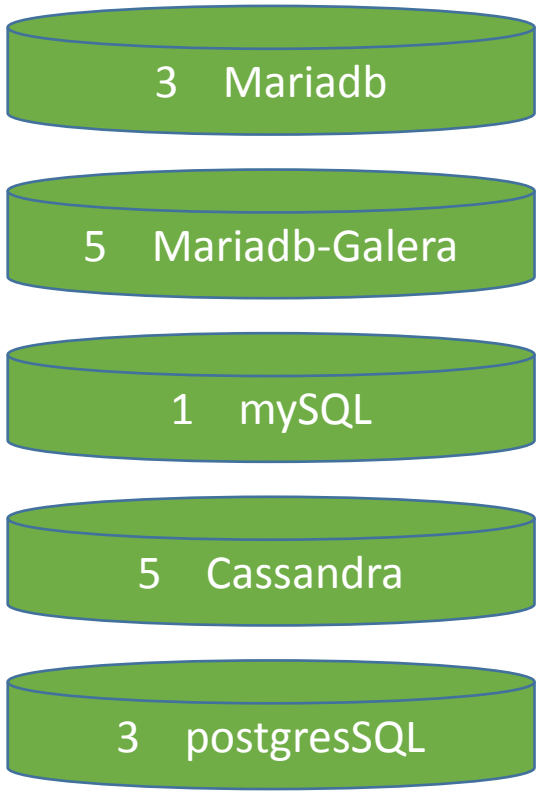
- Reduces the ONAP platform footprint
- Common helm charts limit effort required by individual projects
- Project teams share a common redundancy strategy
- Simplifies cluster storage and management across the deployment

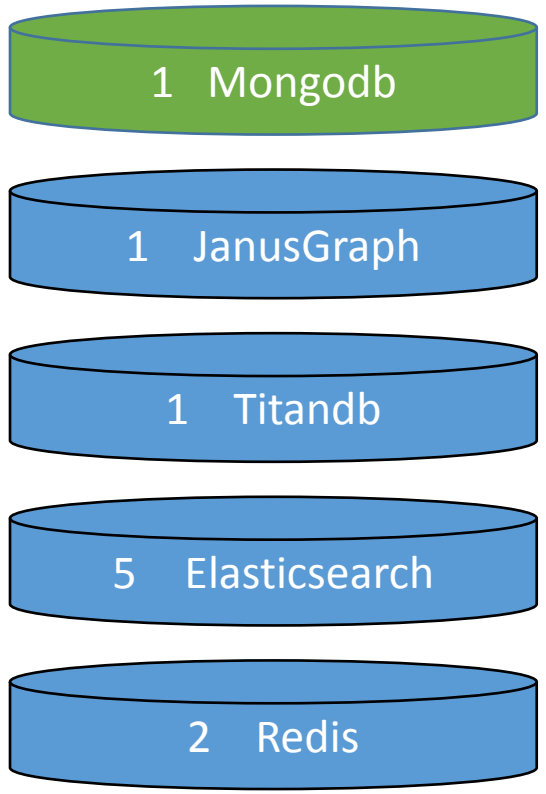
Three Steps:

1. Common DB Charts:
   - `kubernetes/common/postgres`
   - `kubernetes/common/mysql`
2. Clustered DBs:
   - `kubernetes/common/mariadb-galera`
3. **Shared DBs:**
   - **Common DB instance, separate tables**

How many databases are in ONAP?

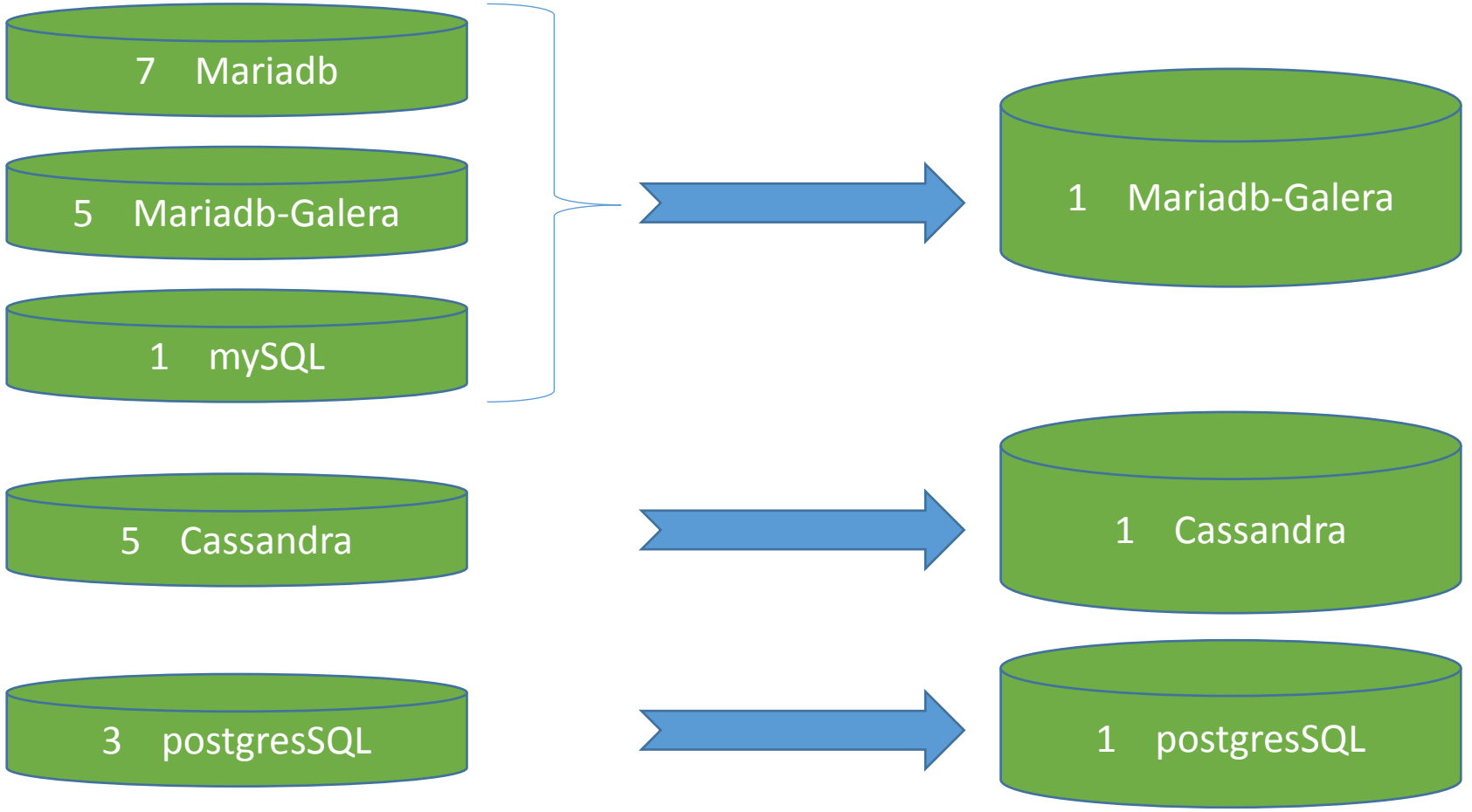
27 Databases in Casablanca!





Database Consolidation

- Focus will be on migrating to a single shared Mariadb-Galera cluster
- Scalable based on needs



Call to Action

Community and PTLs	TSC
Embrace recommendations and collaborate with the teams leading the effort.	Make compliance with recommendations mandatory for Dublin M3.

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Deployment Options
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