Zero downtime database deployments

Moving to a safer release cadence, based on smaller, more frequent deployments, normally requires deployments to occur while the systems are running. That's scary. In this session we'll discuss how to do it safely.

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DATA RELAY

FRIEND OF redgate 2019

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#DevOps

Zero Downtime Database Deployments

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Zero downtime release patterns

Assumptions…

- Source control
- Automated deploy pipelines
- Infra as code

deploy to prod...

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Zero Downtime Database Deployments

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over loaded deploys

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Zero Downtime Database Deployments

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"If we want more changes, we need more deployments."

Chuck Rossi, Facebook
DevOps Handbook, p154

"Deployment need not expose customers to a new version of your service."

Deploy != Release

Art Gillespie, Deploy != Release

blog.turbinelabs.io/deploy-not-equal-release-part-one-4724bc1e726b

Release patterns

Environment-based

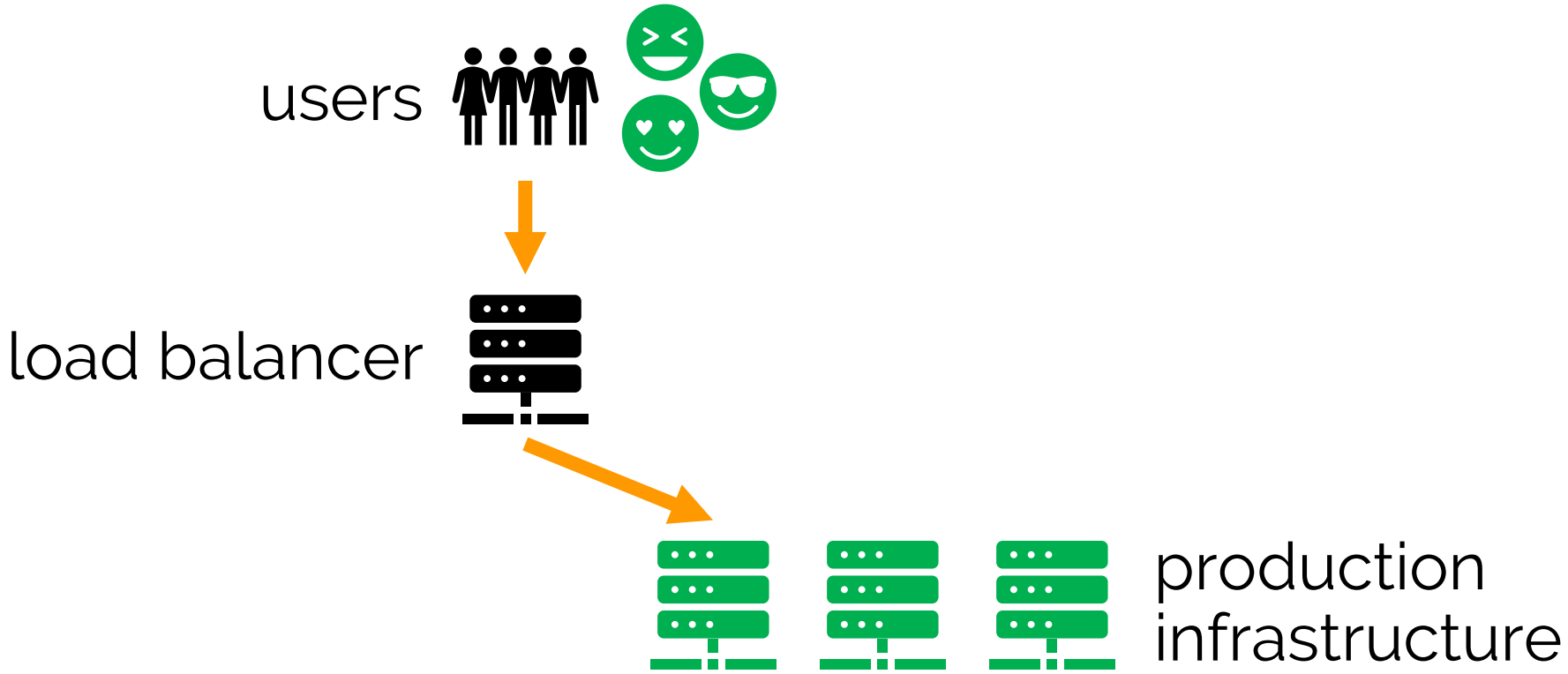
- Blue – Green deployments
- Canary
- Cluster immune system

Application-based

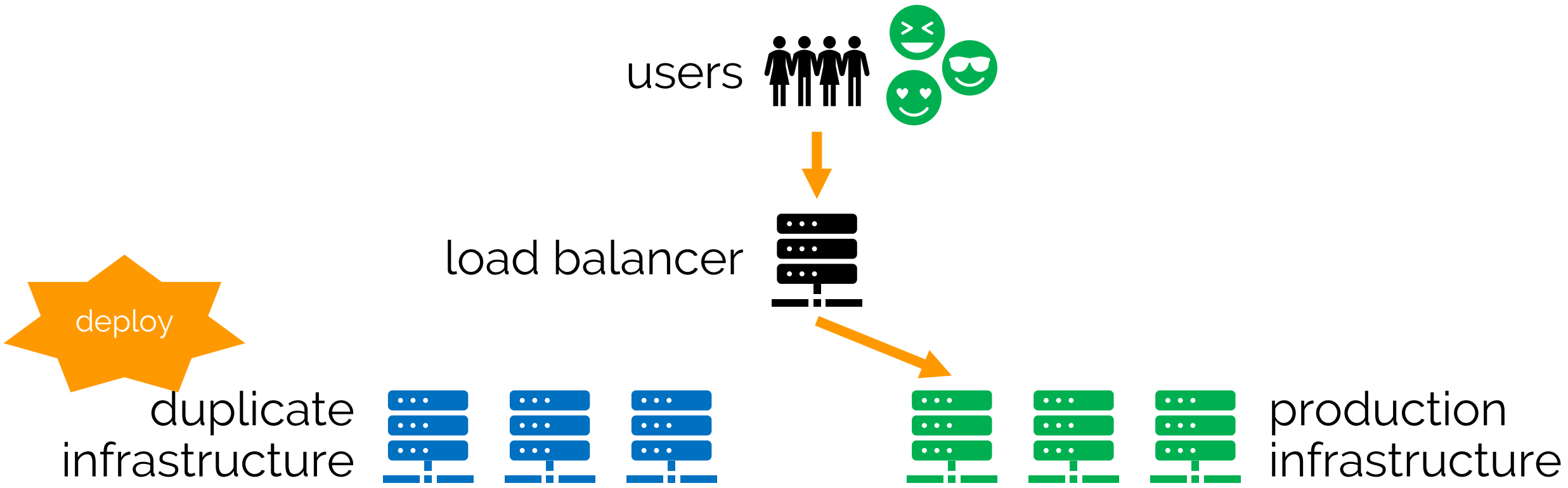
- Feature toggles
- Dark launches

Environment-based

Blue – Green deployments



Blue – Green deployments



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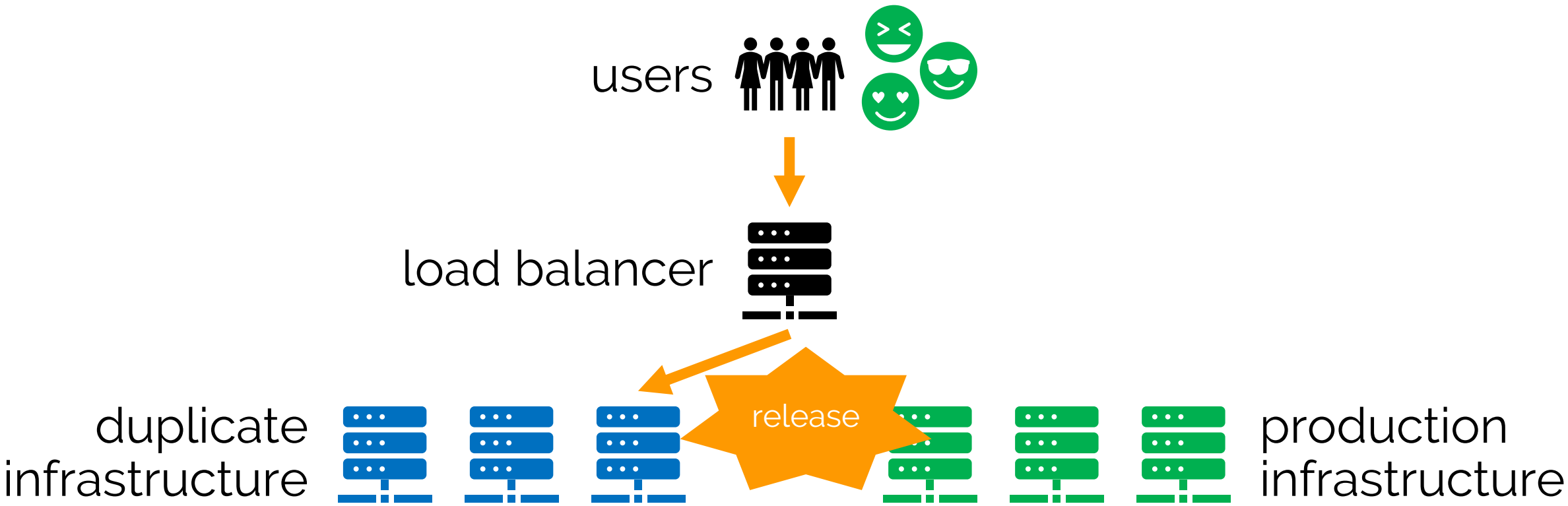

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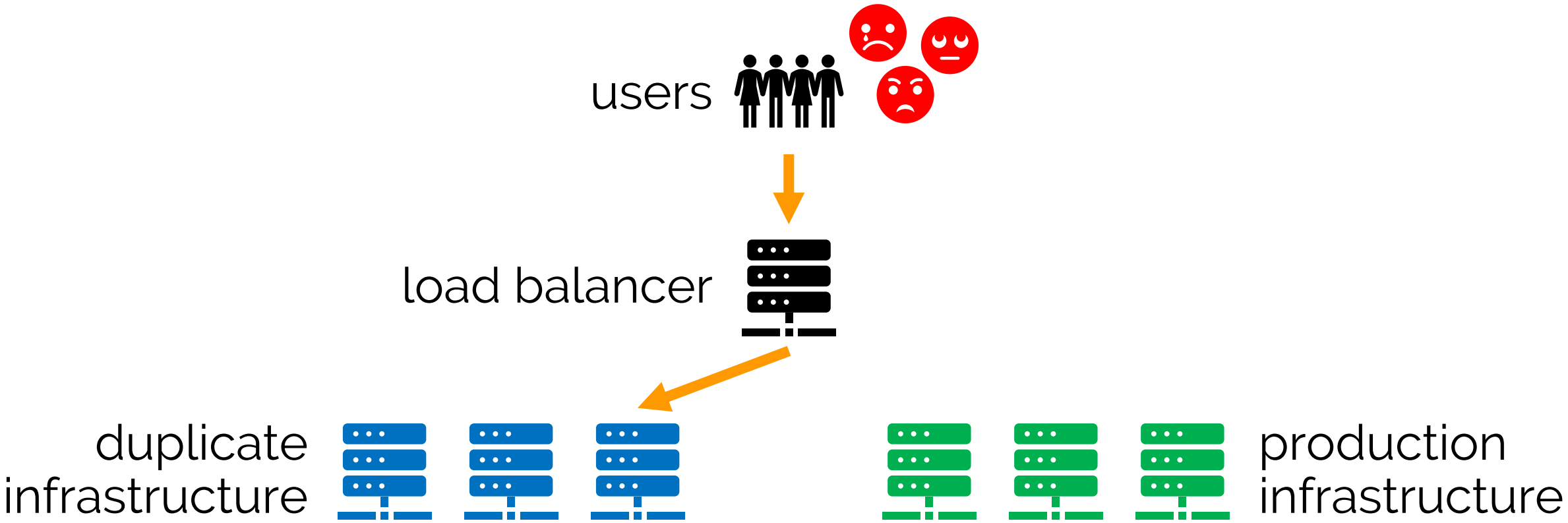

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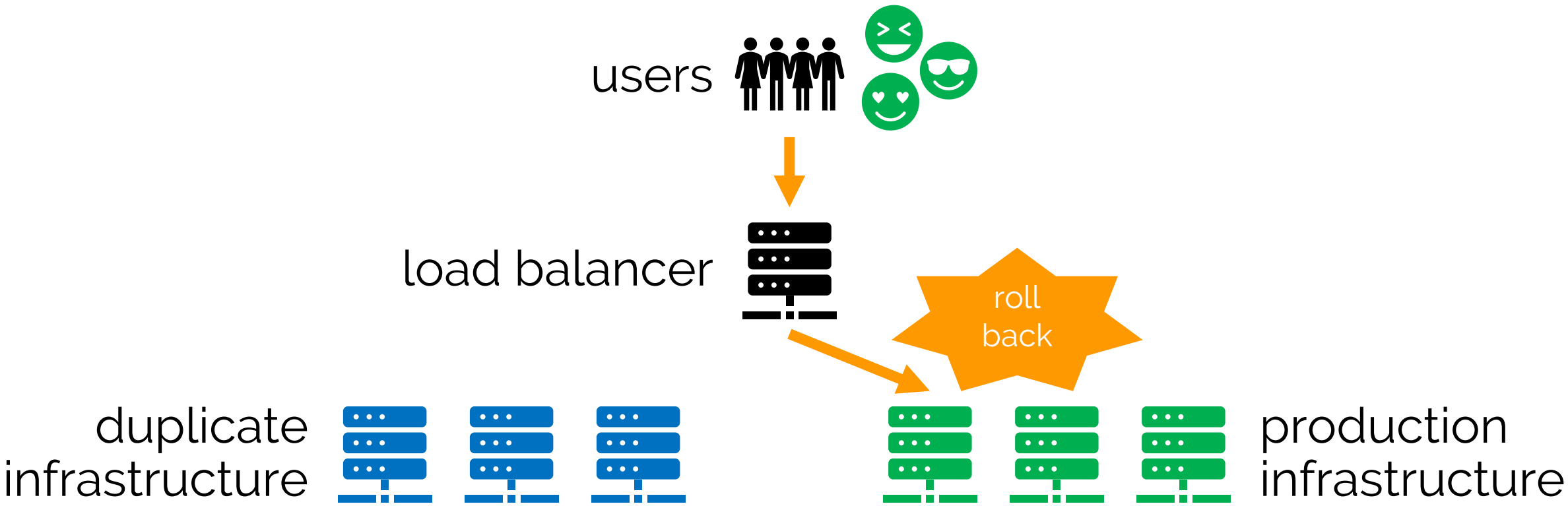
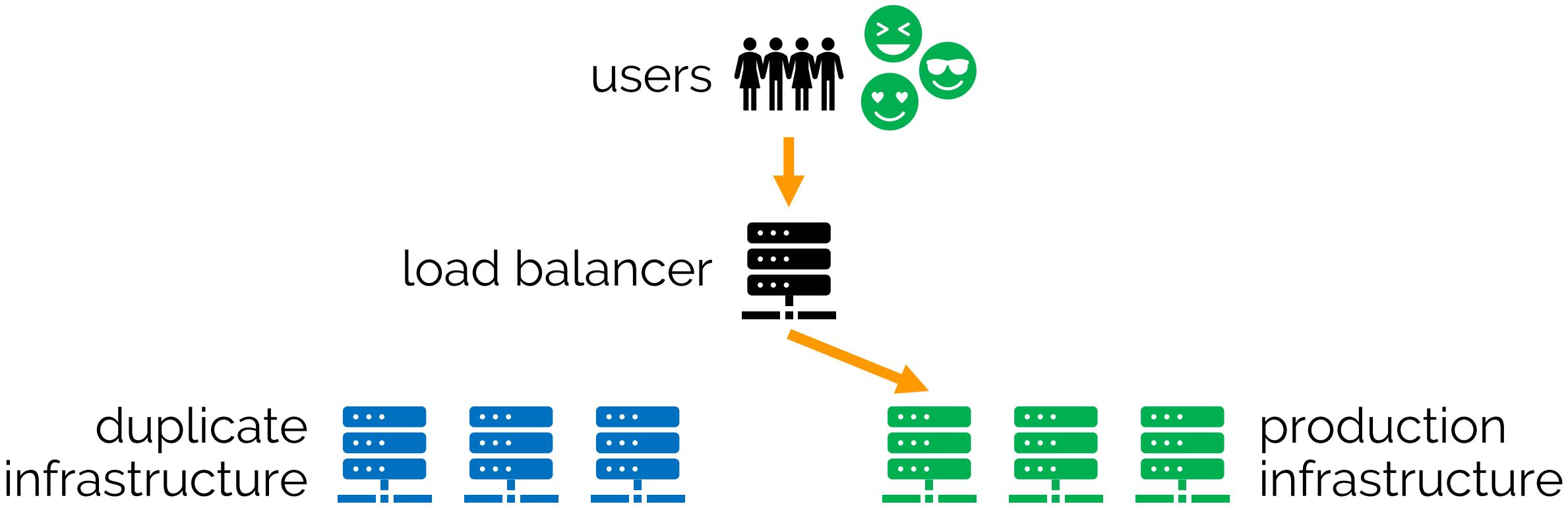


Canary deployments



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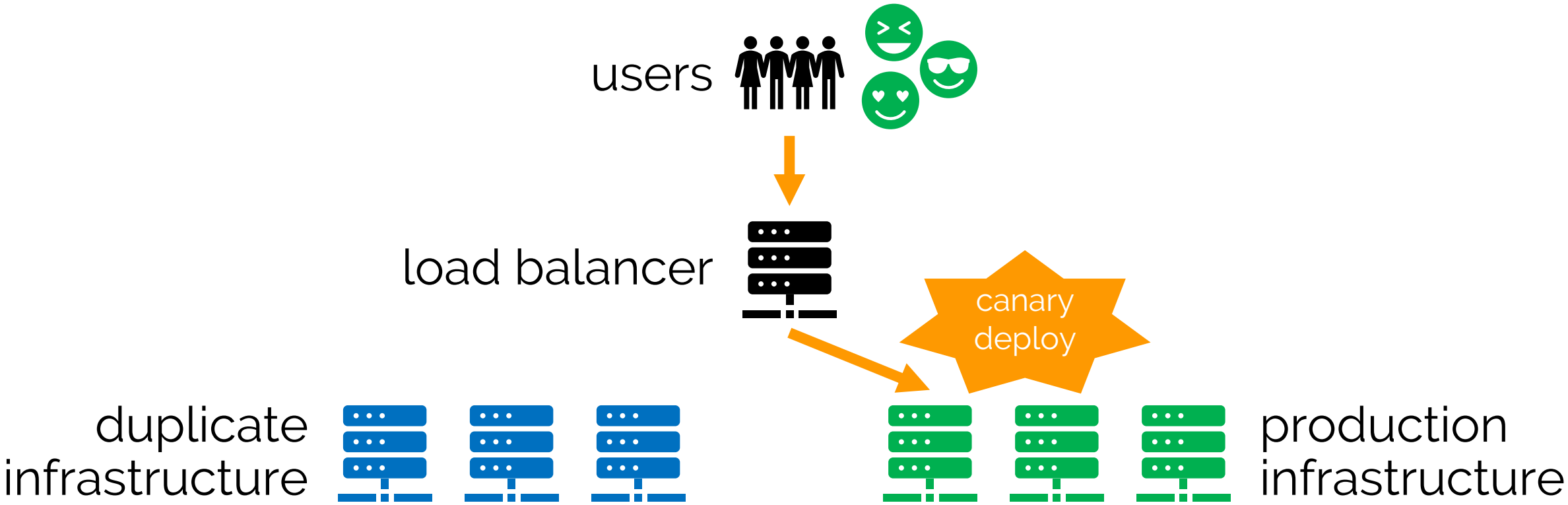

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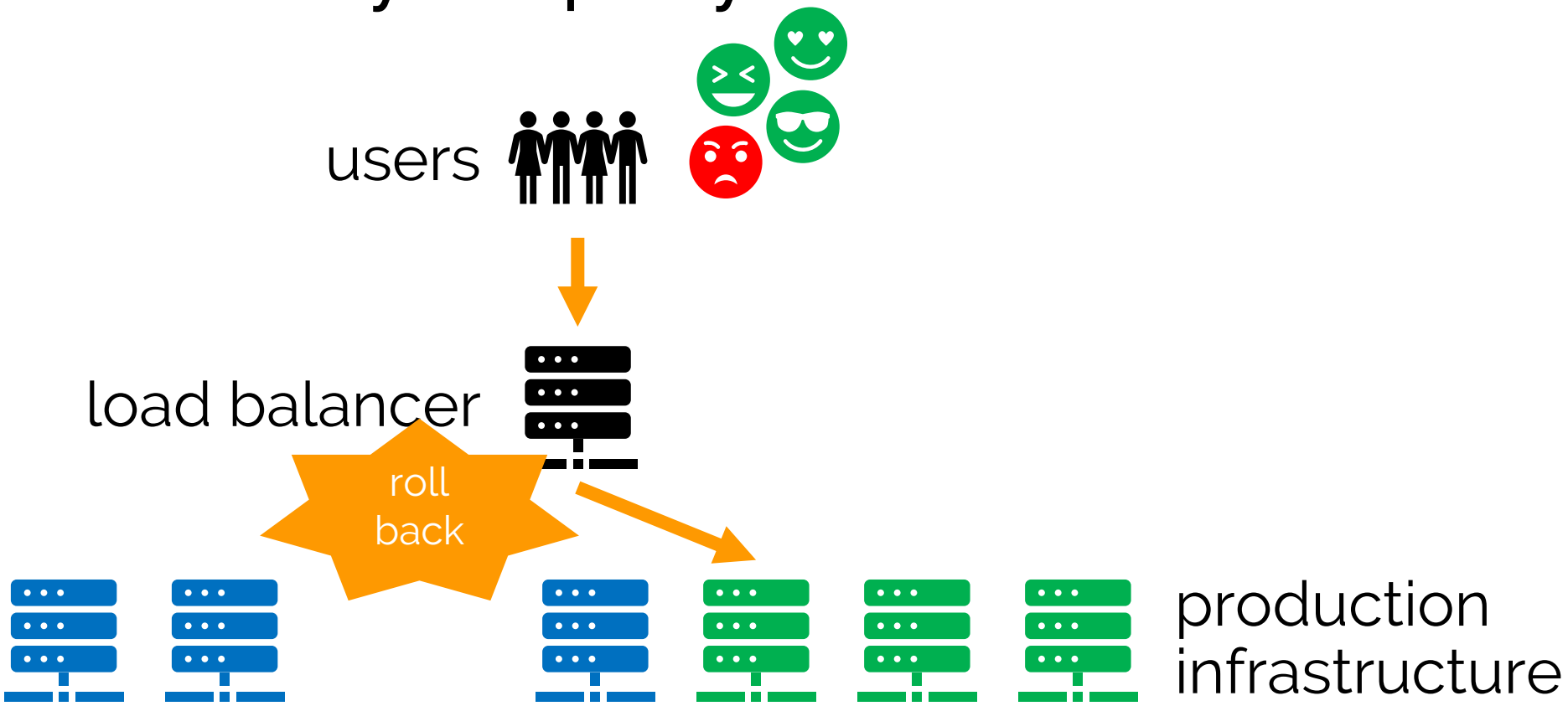

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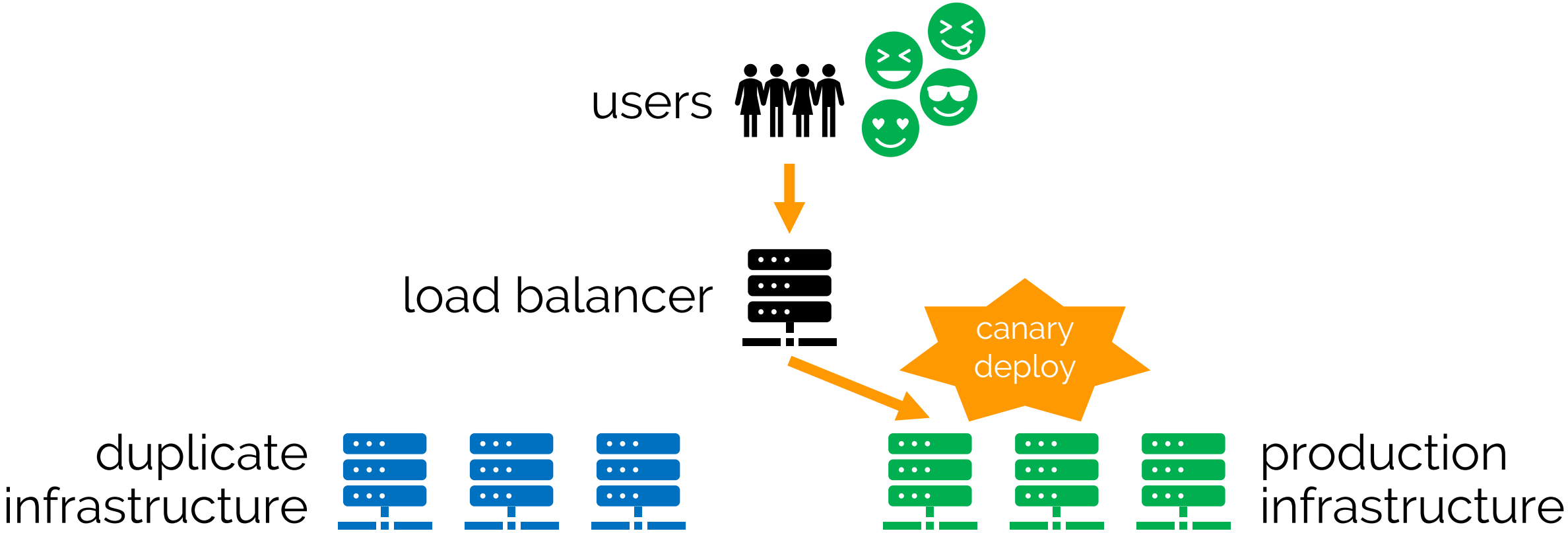

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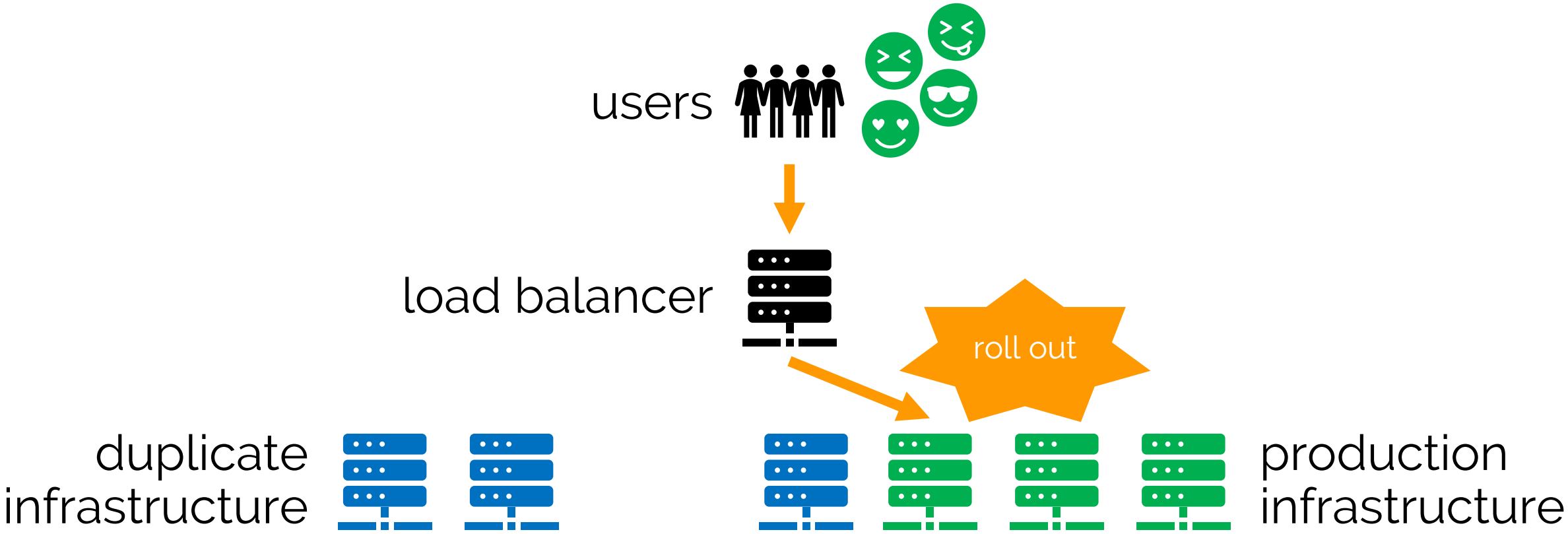

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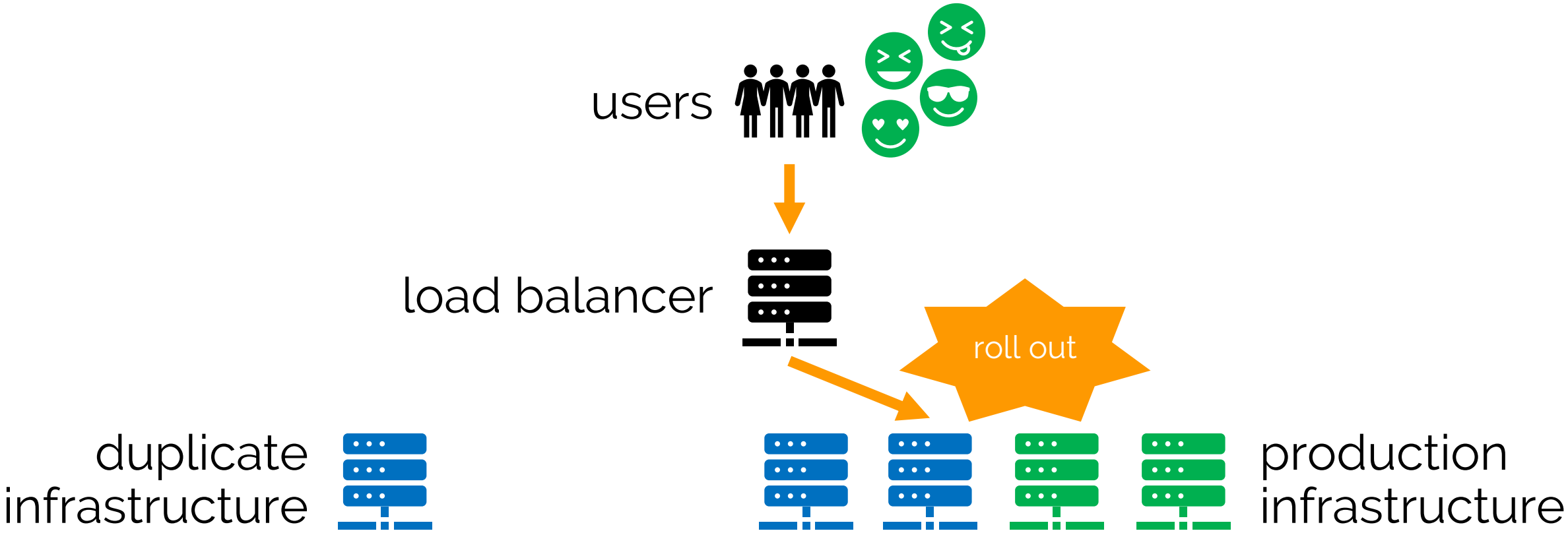
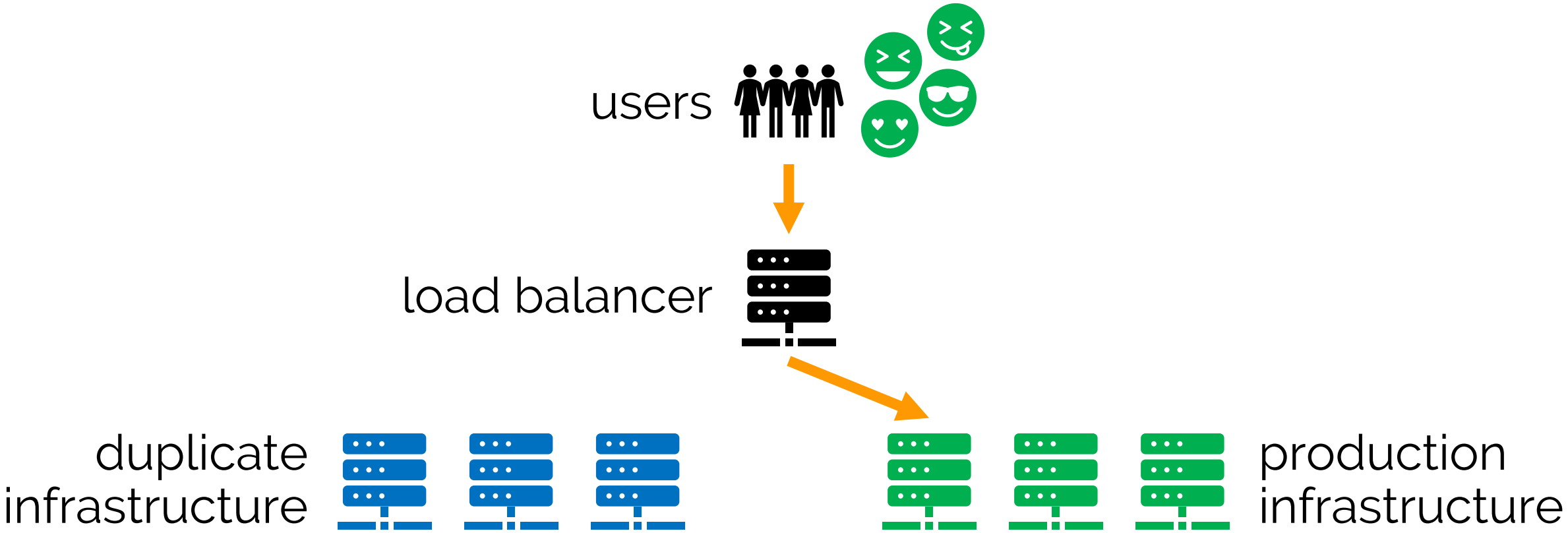


Cluster immune systems



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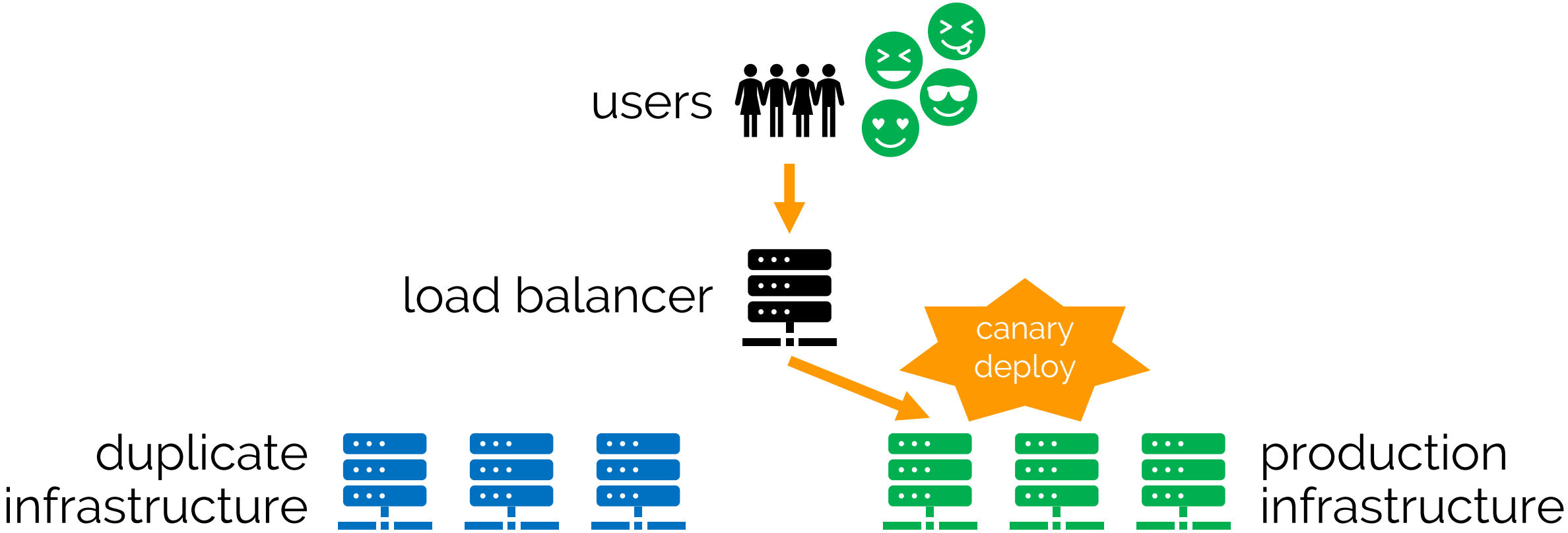

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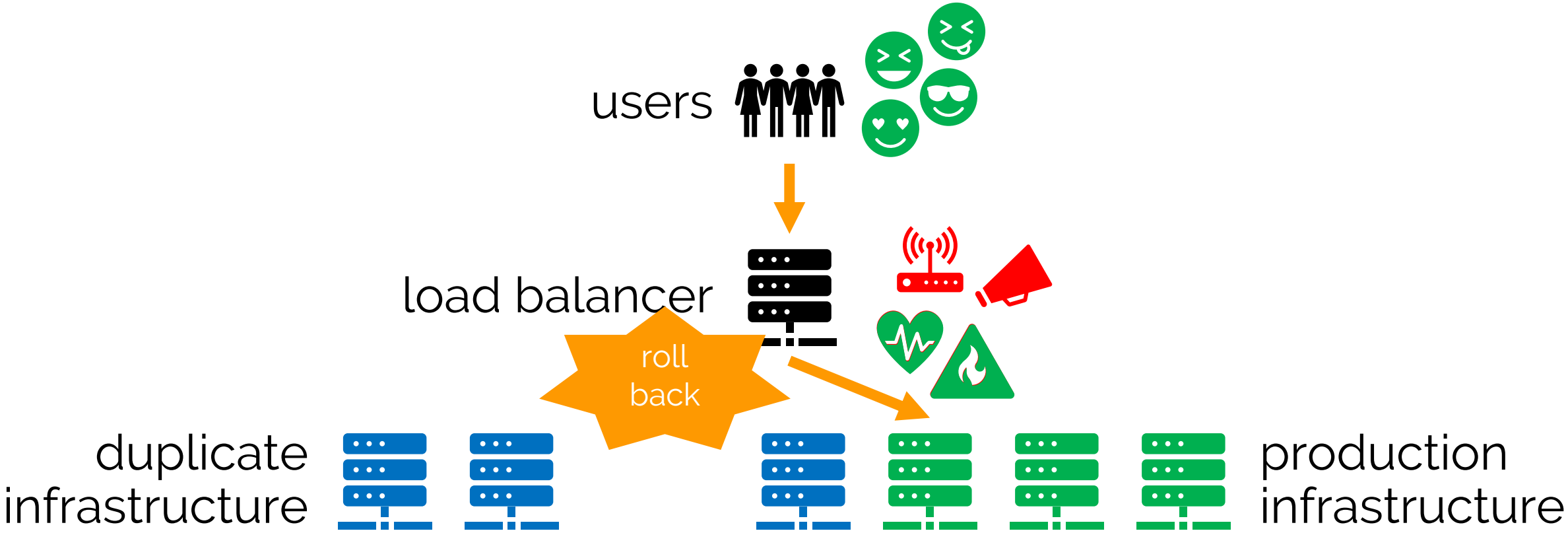

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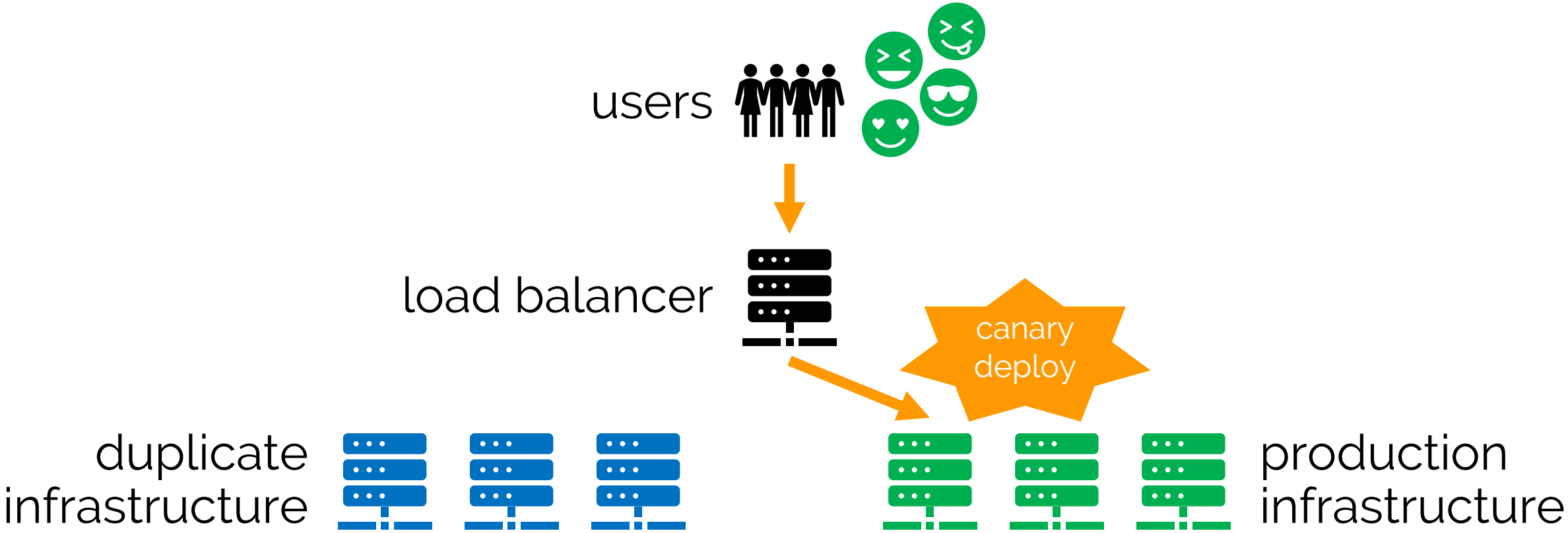

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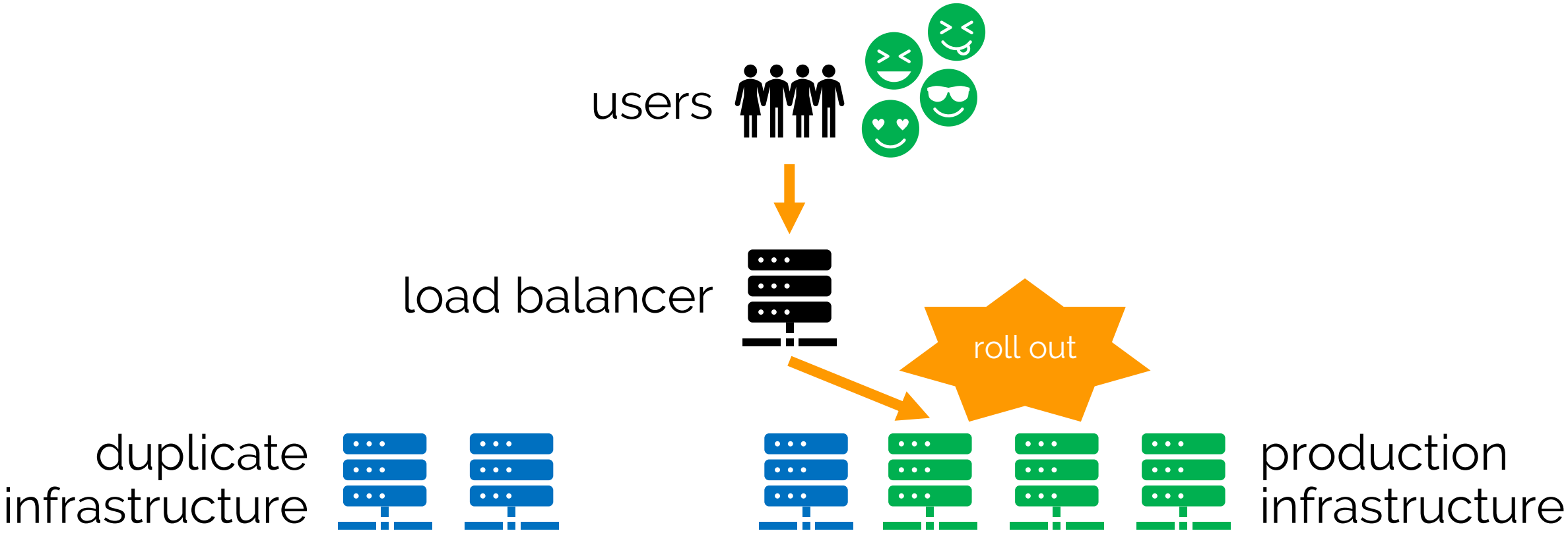

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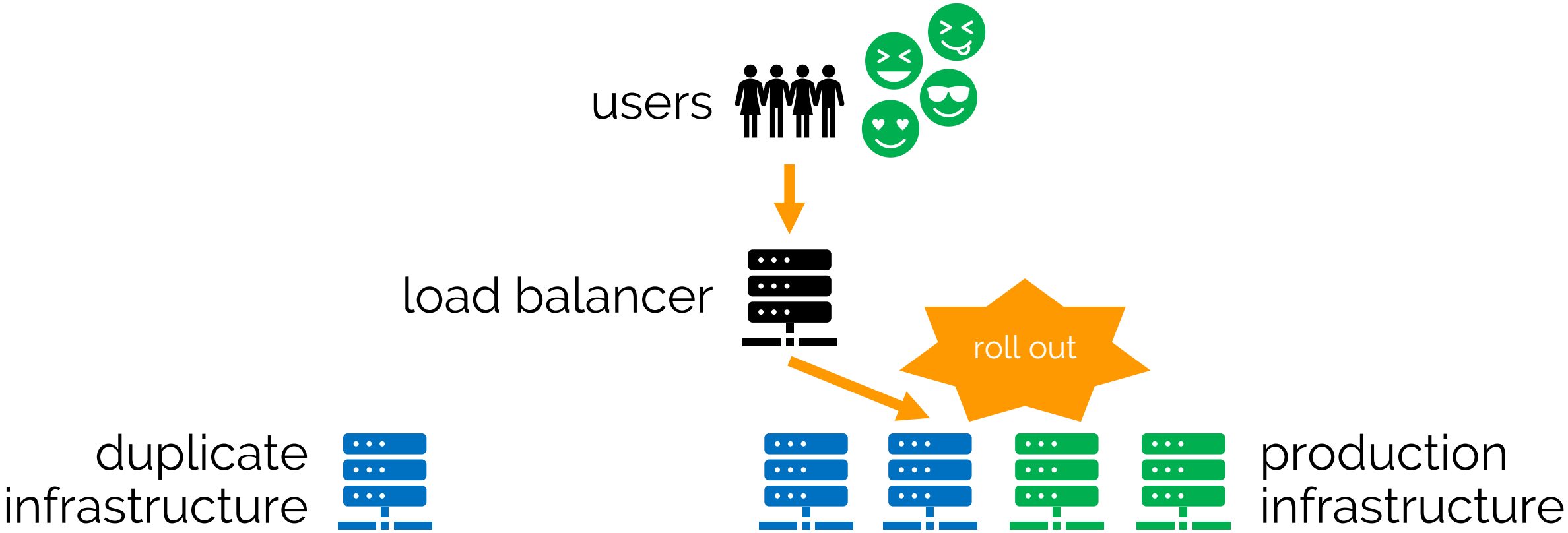


Application-based

Feature Toggles

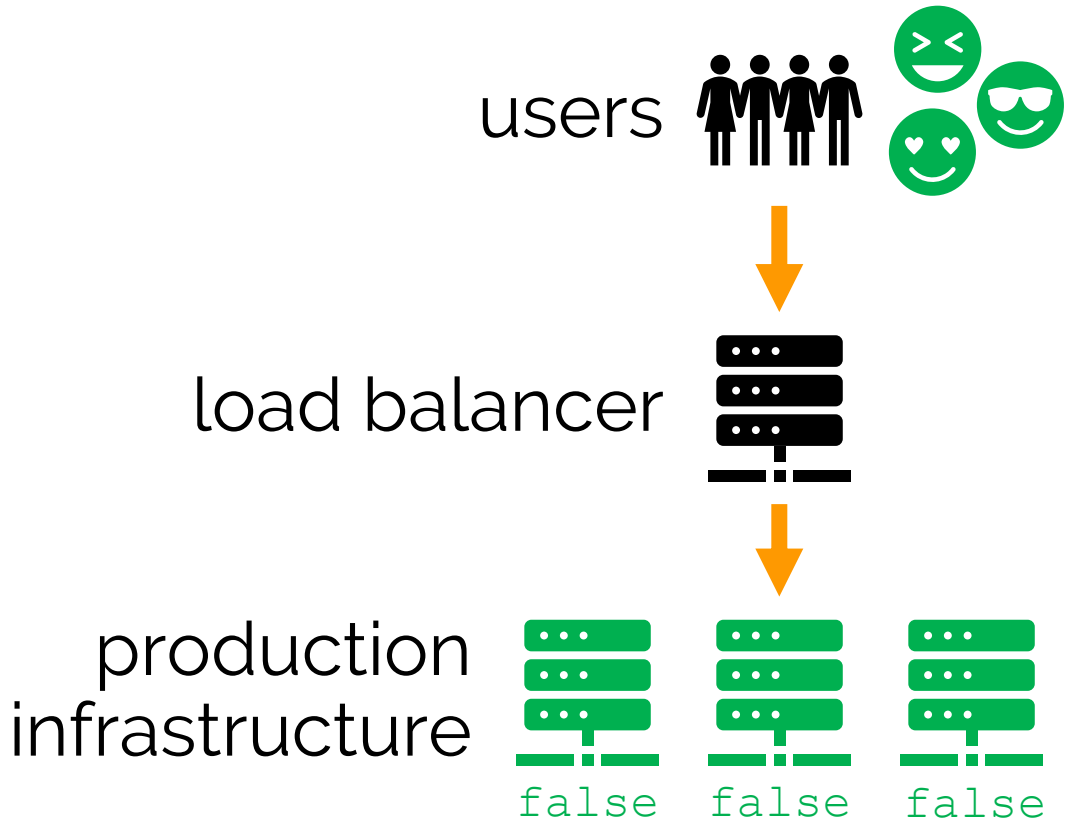
```
function reticulateSplines(){
  // current implementation lives here
}
```

```
// Attribution: https://martinfowler.com/articles/feature-toggles.html
```

Feature Toggles

```
function reticulateSplines(){
  var useNewAlgorithm = false;
  // useNewAlgorithm = true; // UNCOMMENT IF YOU ARE WORKING ON THE NEW SR ALGORITHM

  if( useNewAlgorithm ){
    return enhancedSplineReticulation();
  }else{
    return oldFashionedSplineReticulation();
  }
}

function oldFashionedSplineReticulation(){
  // current implementation lives here
}

function enhancedSplineReticulation(){
  // TODO: implement better SR algorithm
}

// Attribution: https://martinfowler.com/articles/feature-toggles.html
```

Feature Toggles



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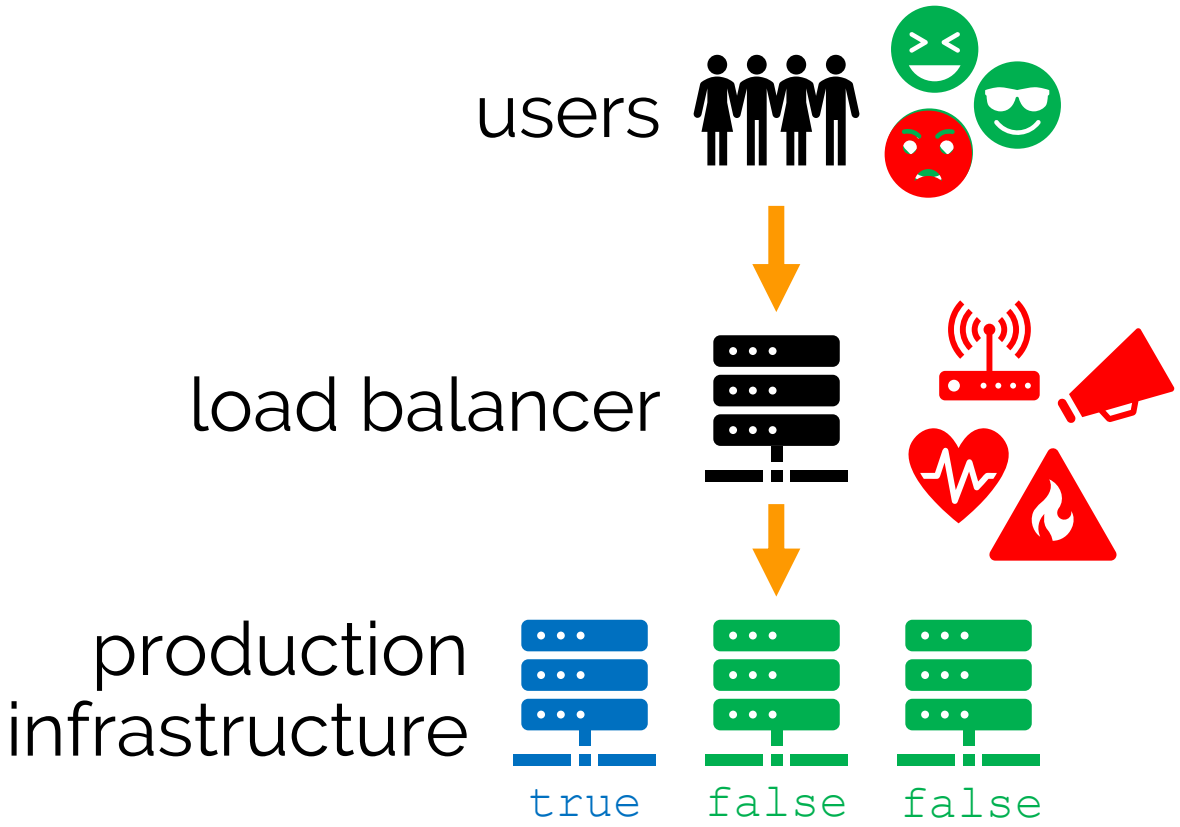

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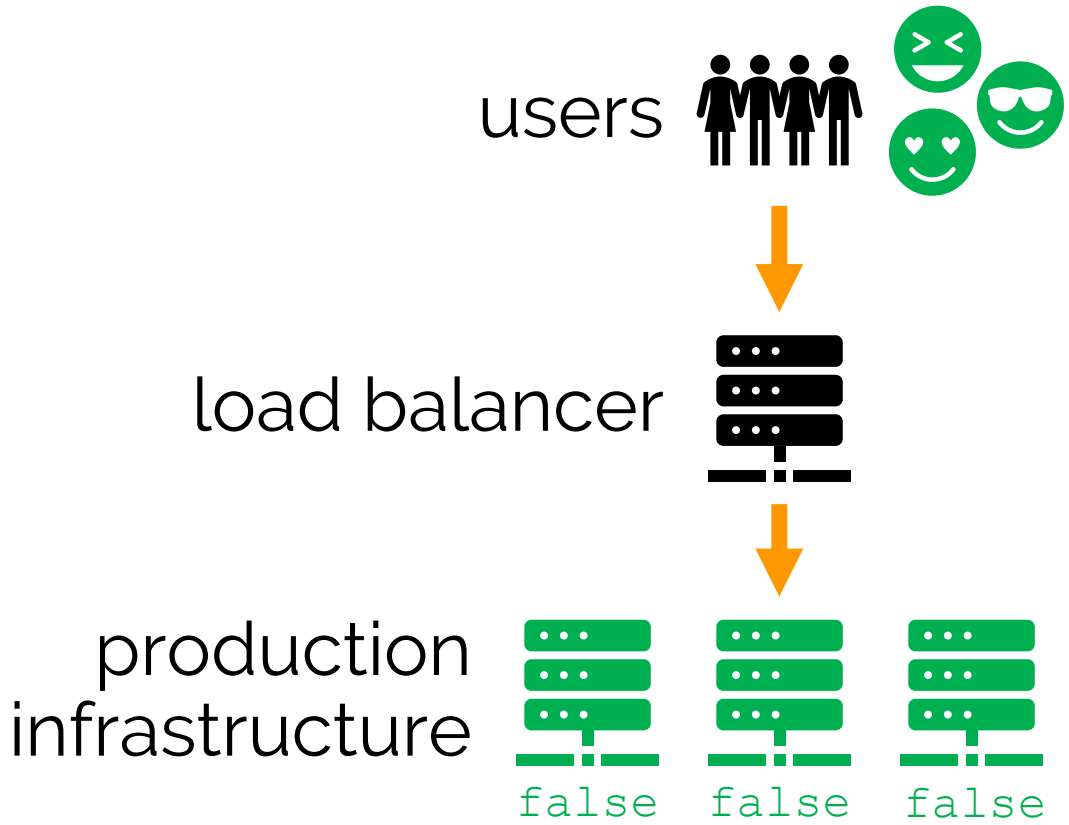

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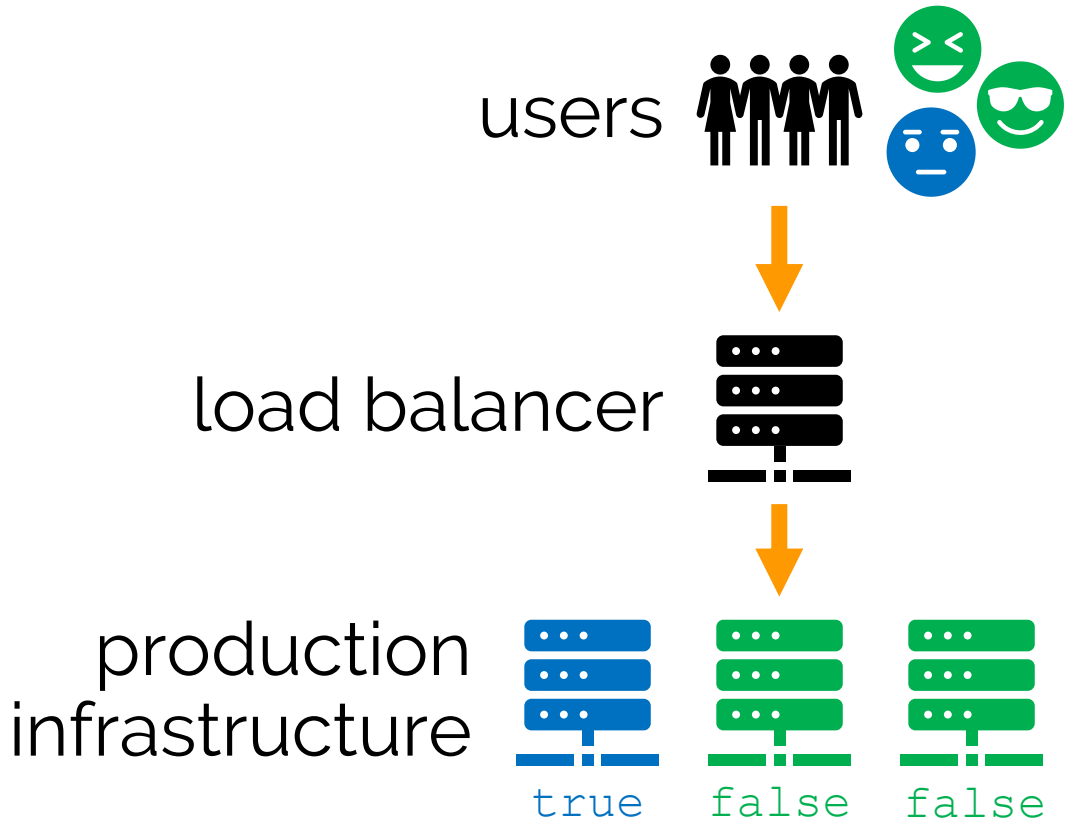

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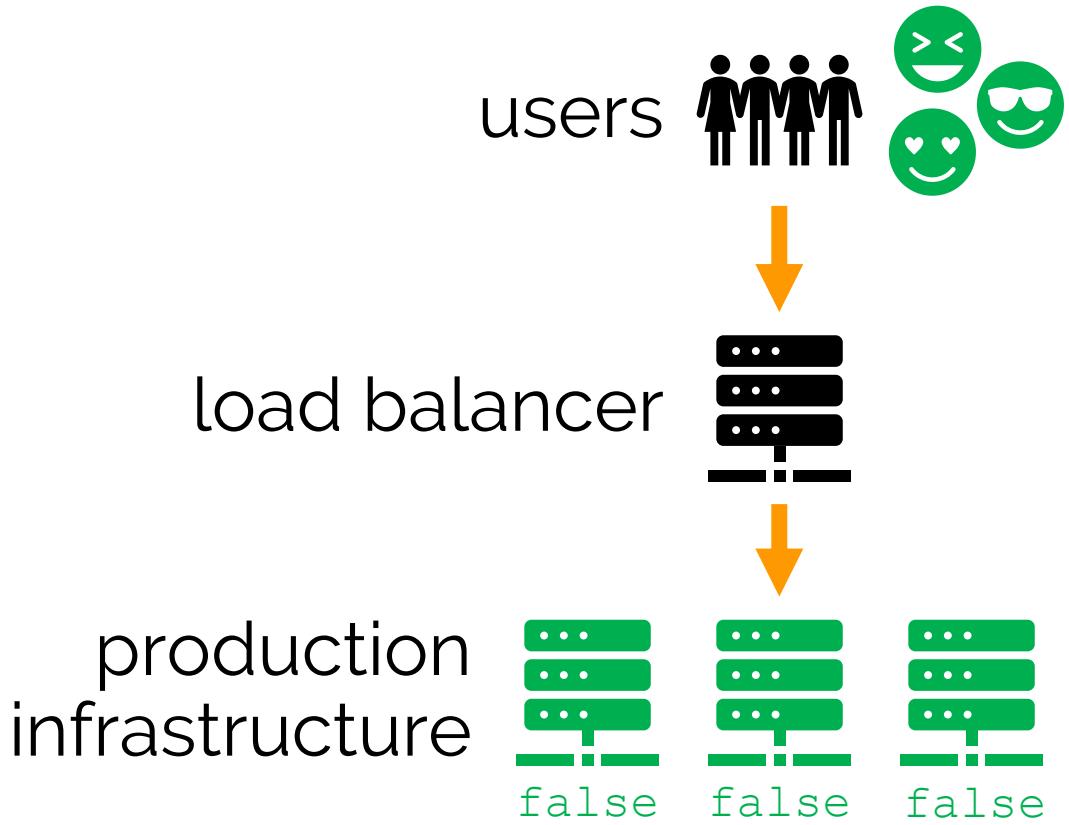
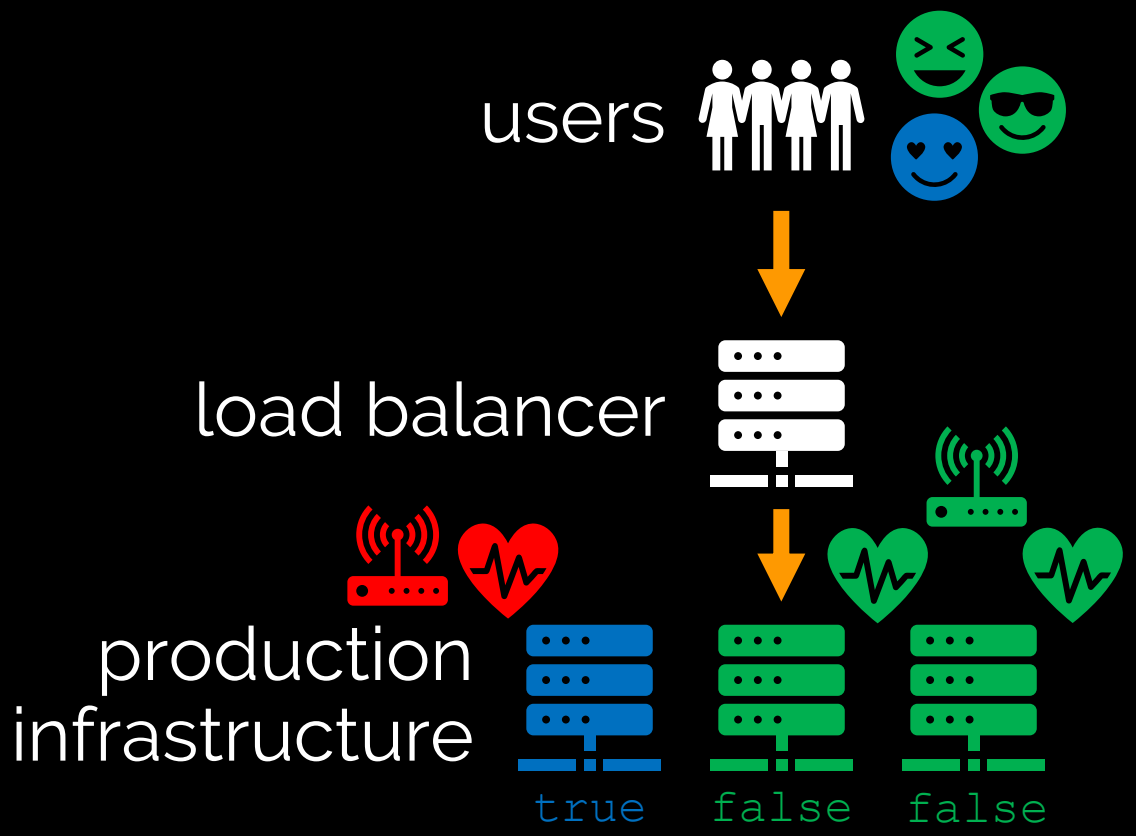


Dark launches



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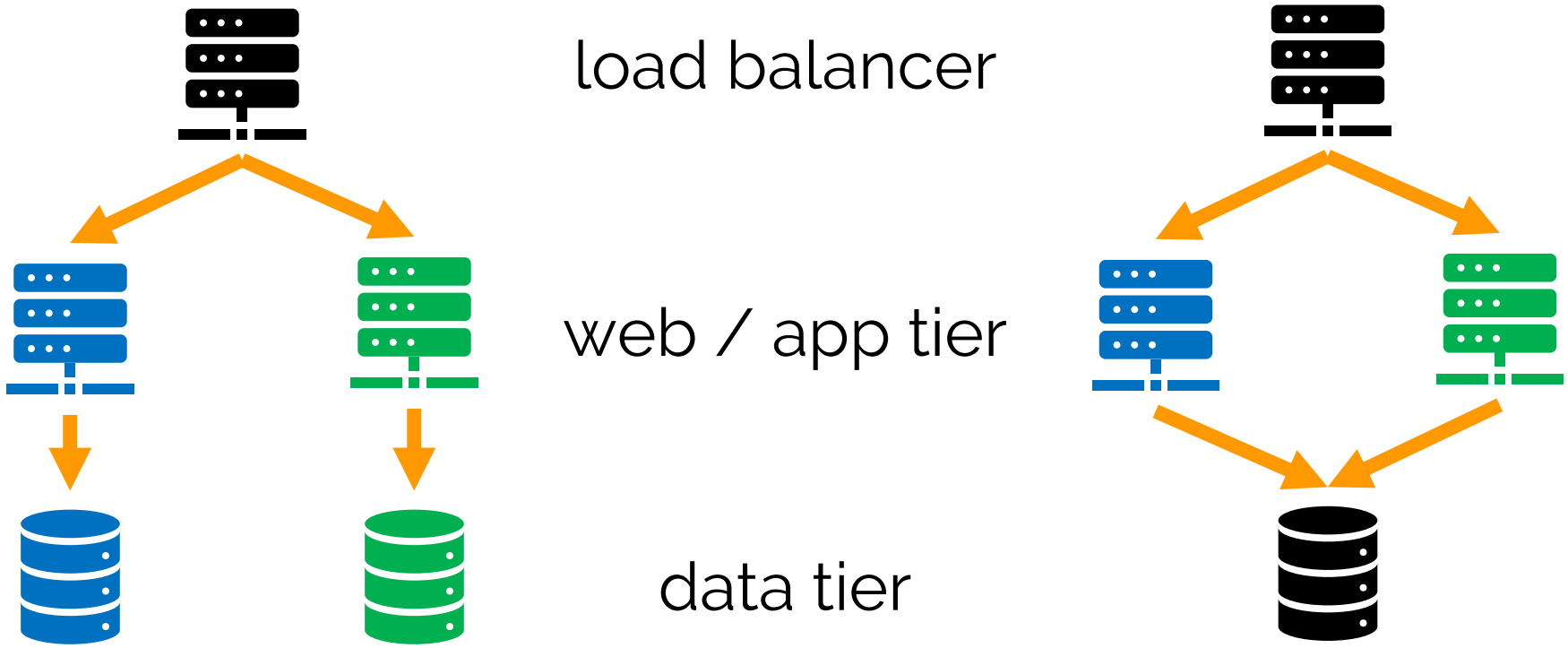
Let's talk about data

Data and databases



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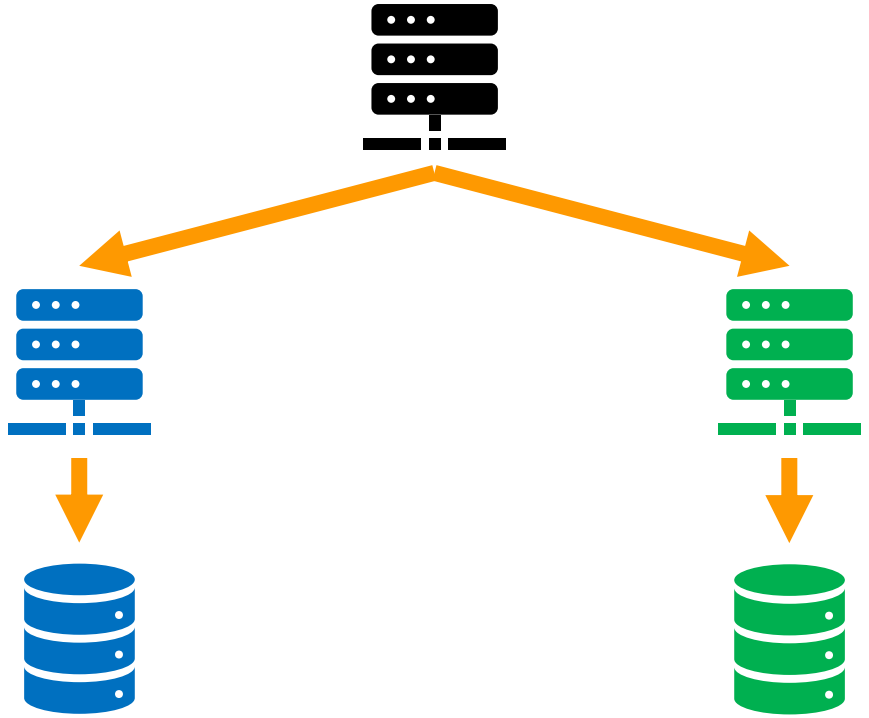
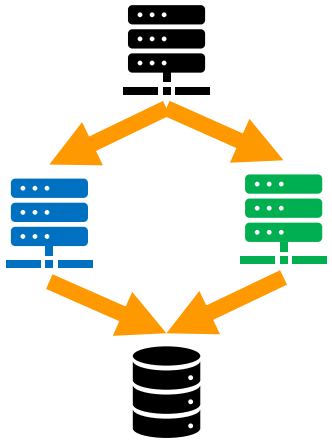
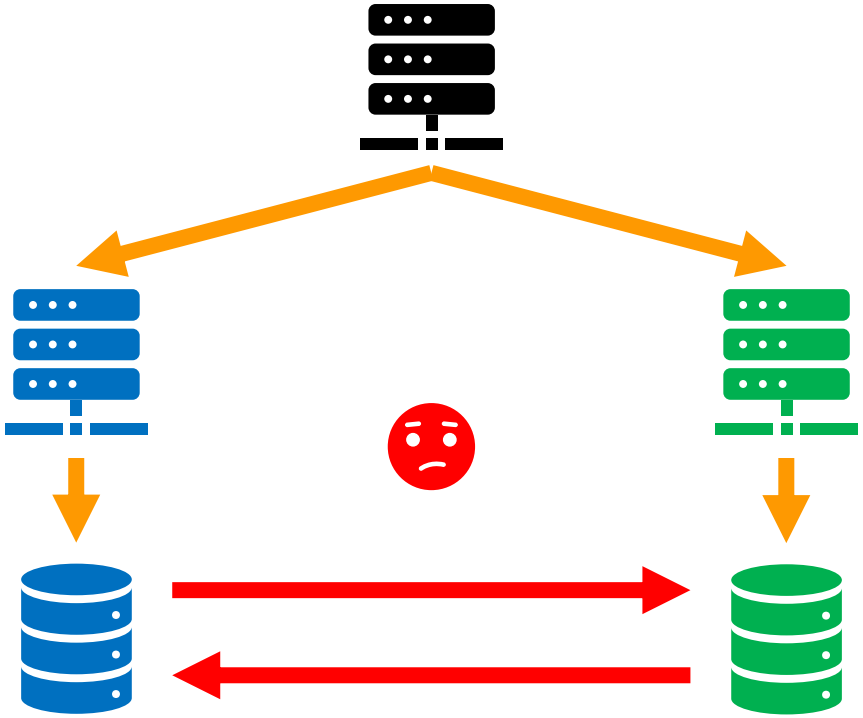
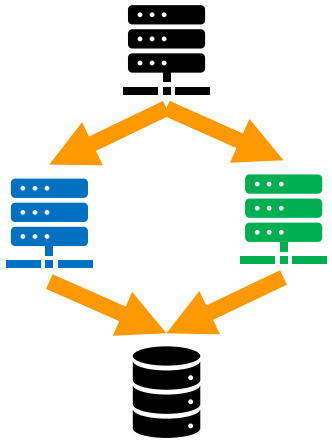




Data and databases





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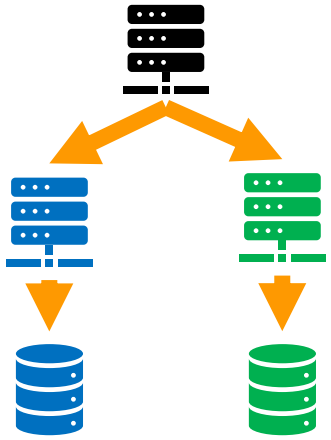

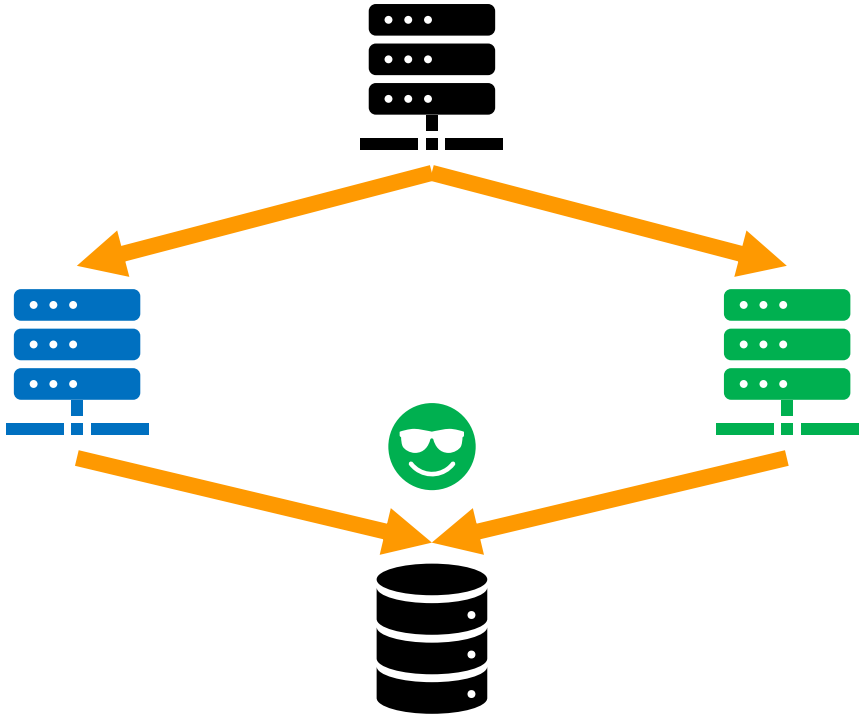

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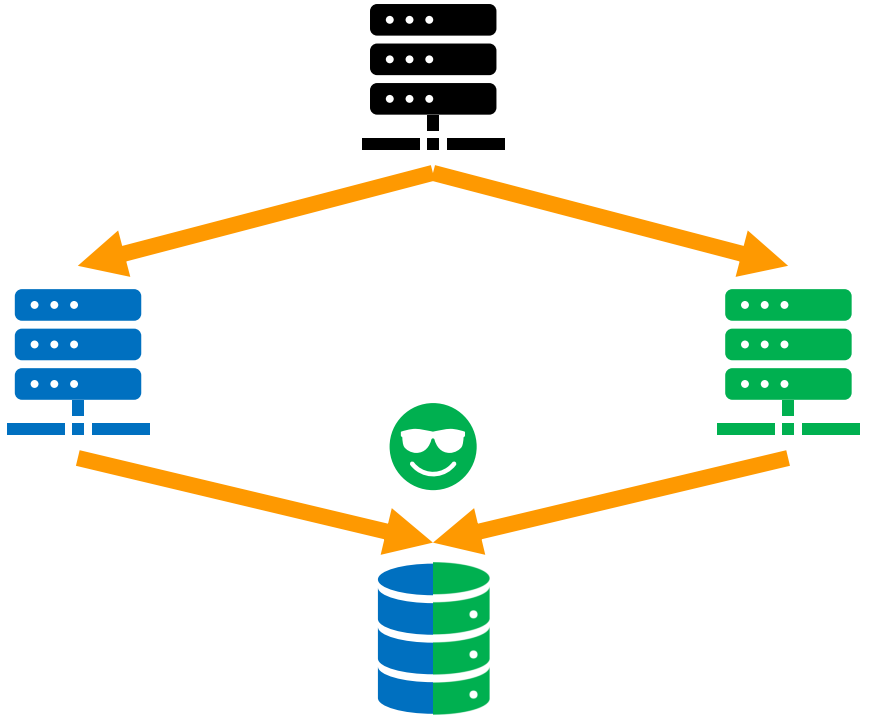
Data and databases



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Zero Downtime Database Deployments

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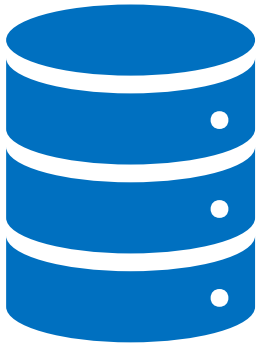
Expand / Contract

Splitting a column

FullName
Martin Fowler
Pete Hodgeson
Danilo Sato

Splitting a column



FirstName	LastName
Martin	Fowler
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FullName
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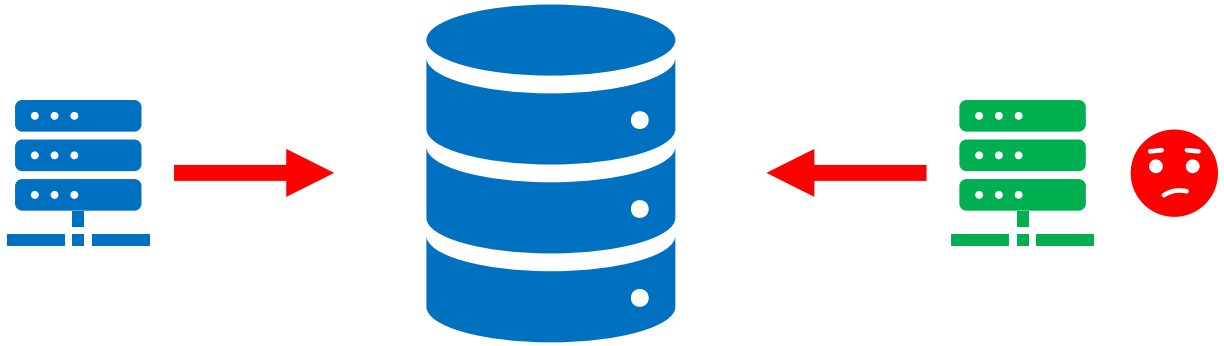

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Splitting a column

FullName
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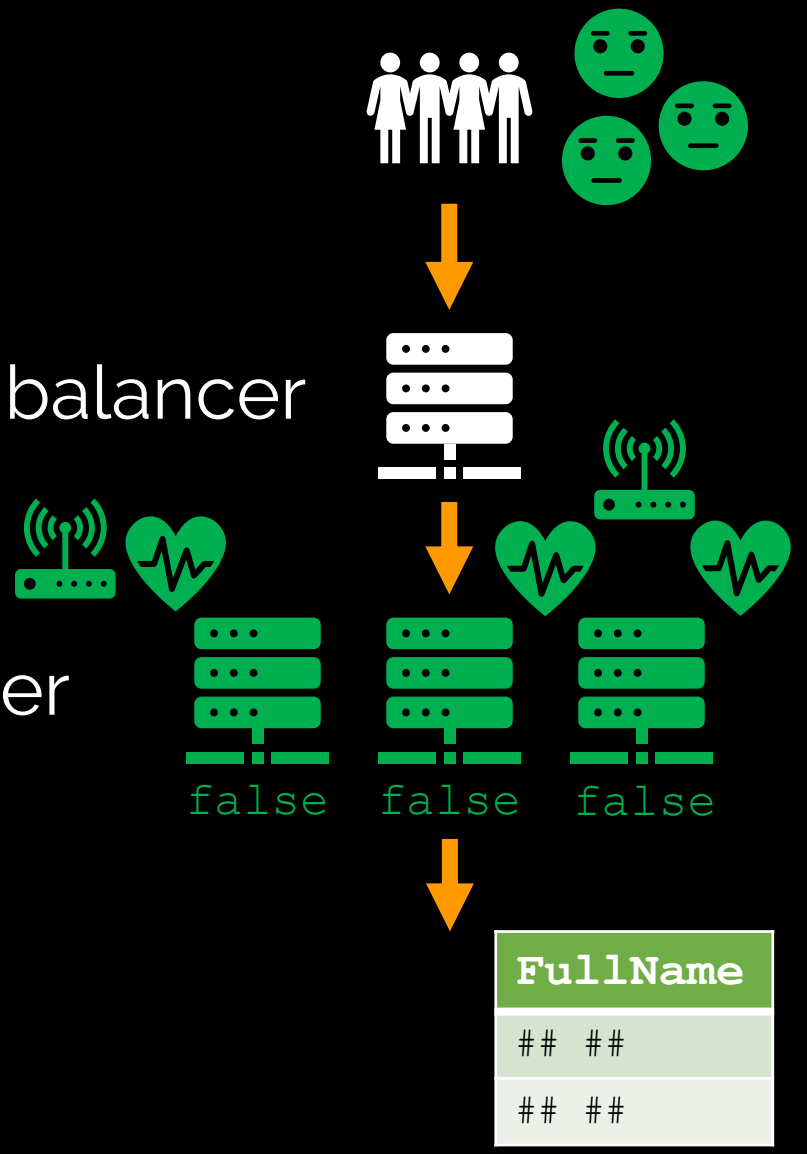
Splitting a column

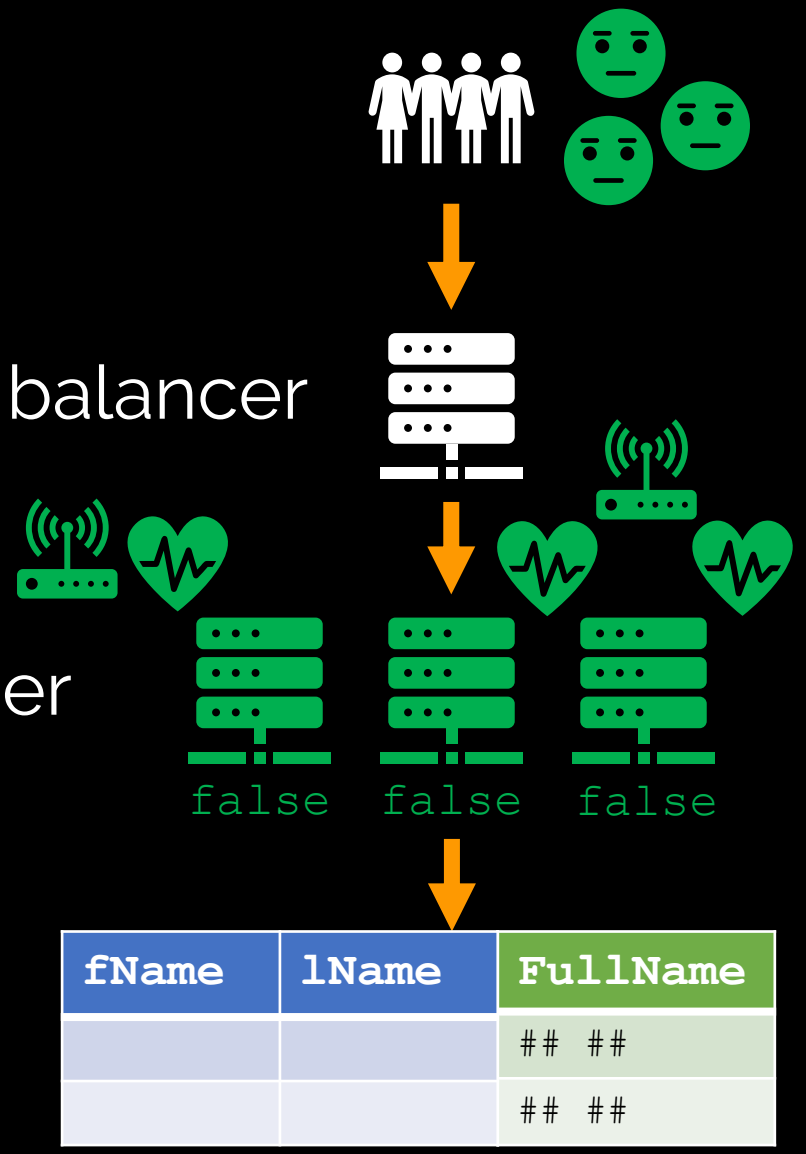
FirstName	LastName	FullName
Martin	Fowler	Martin Fowler
Pete	Hodgeson	Pete Hodgeson
Danilo	Sato	Danilo Sato

Putting it all together



Putting it all together

1. Expand DB



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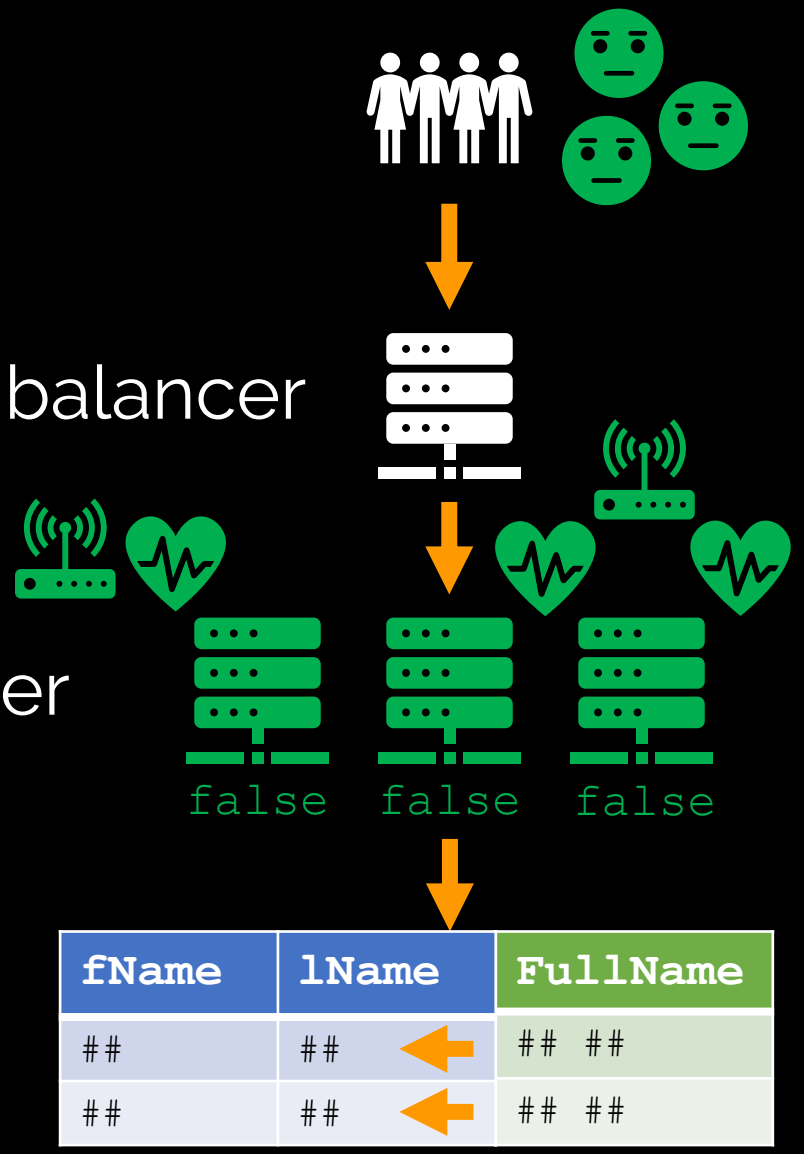

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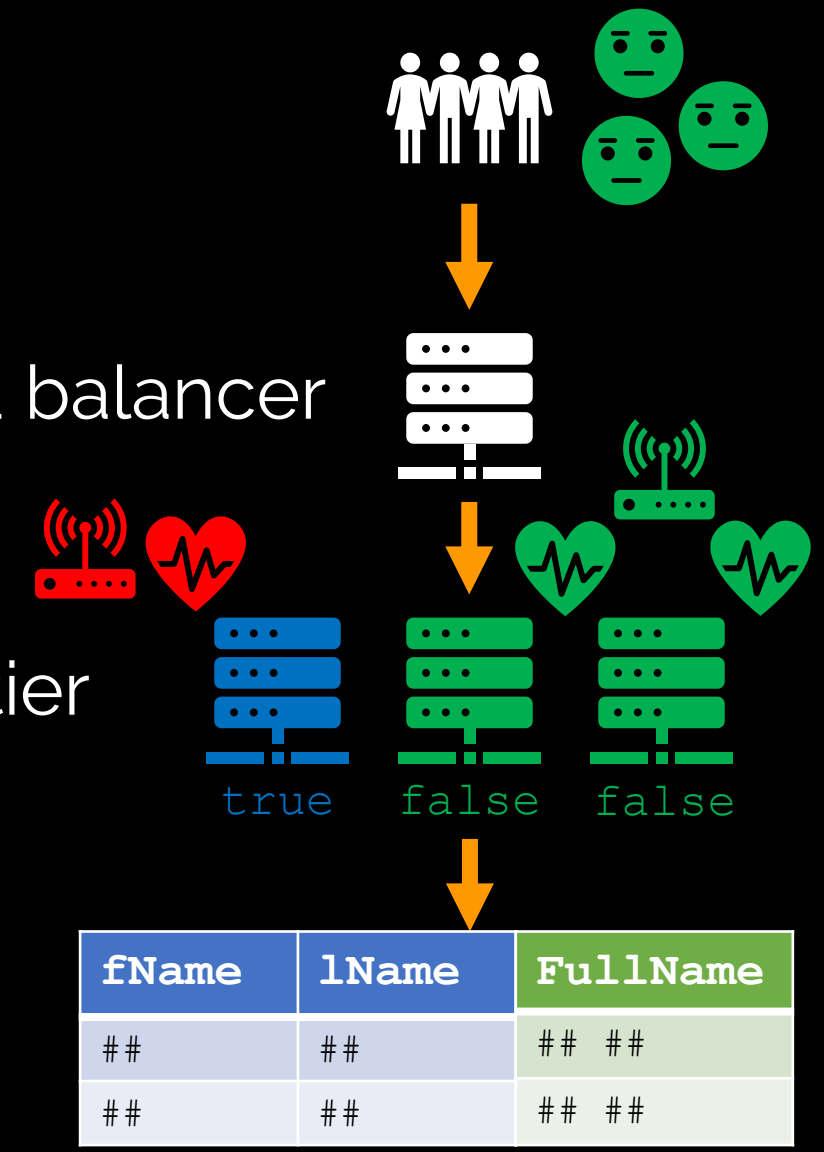
Putting it all together

1. Expand DB
2. Release canary



Putting it all together

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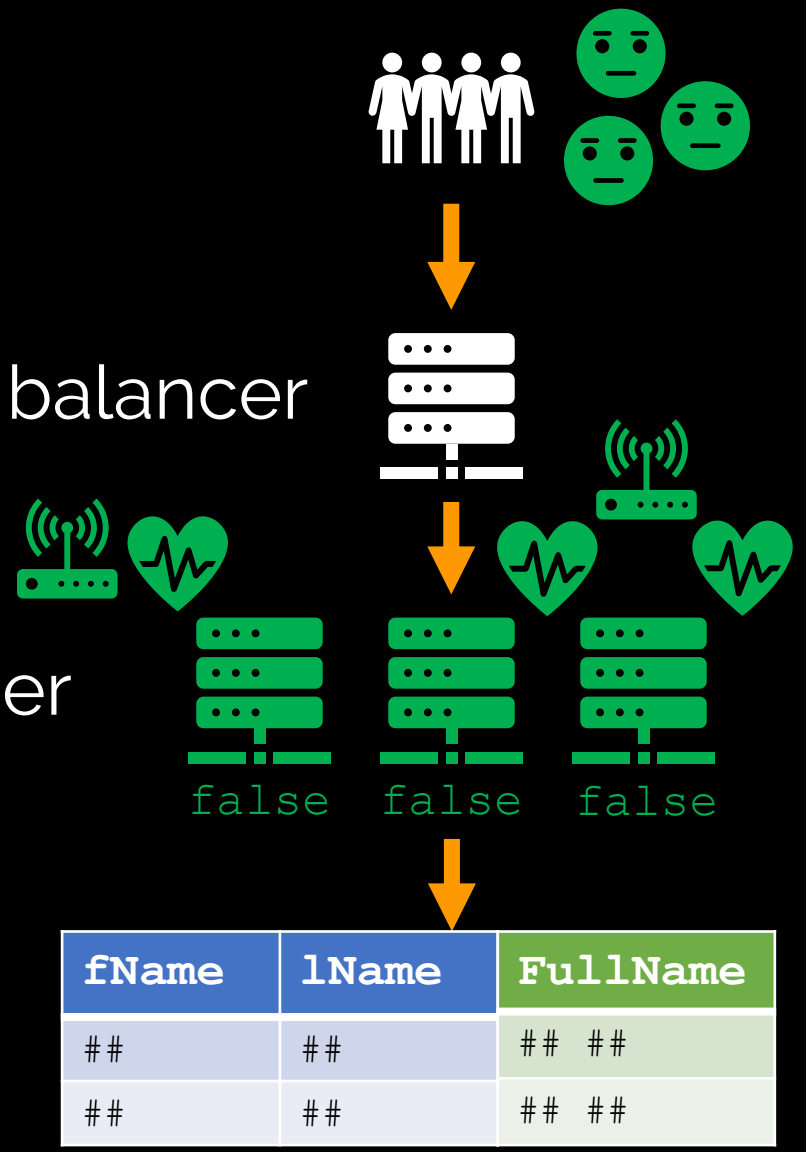

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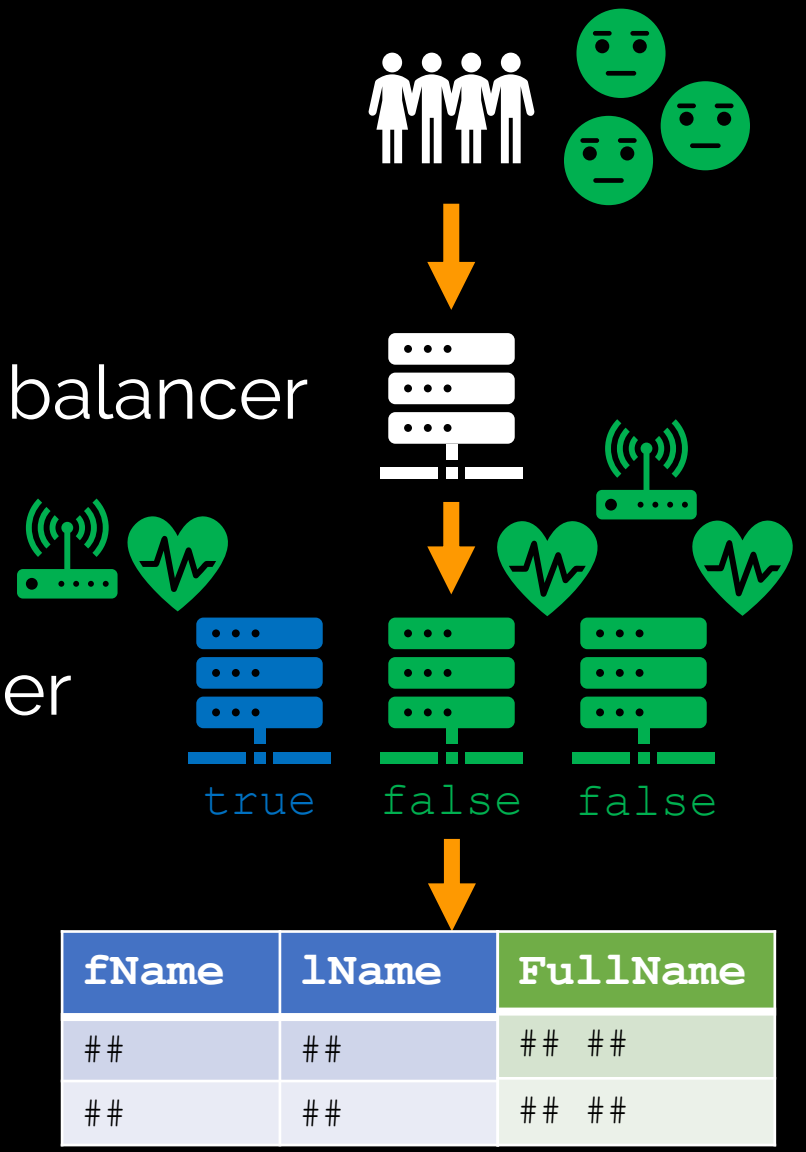
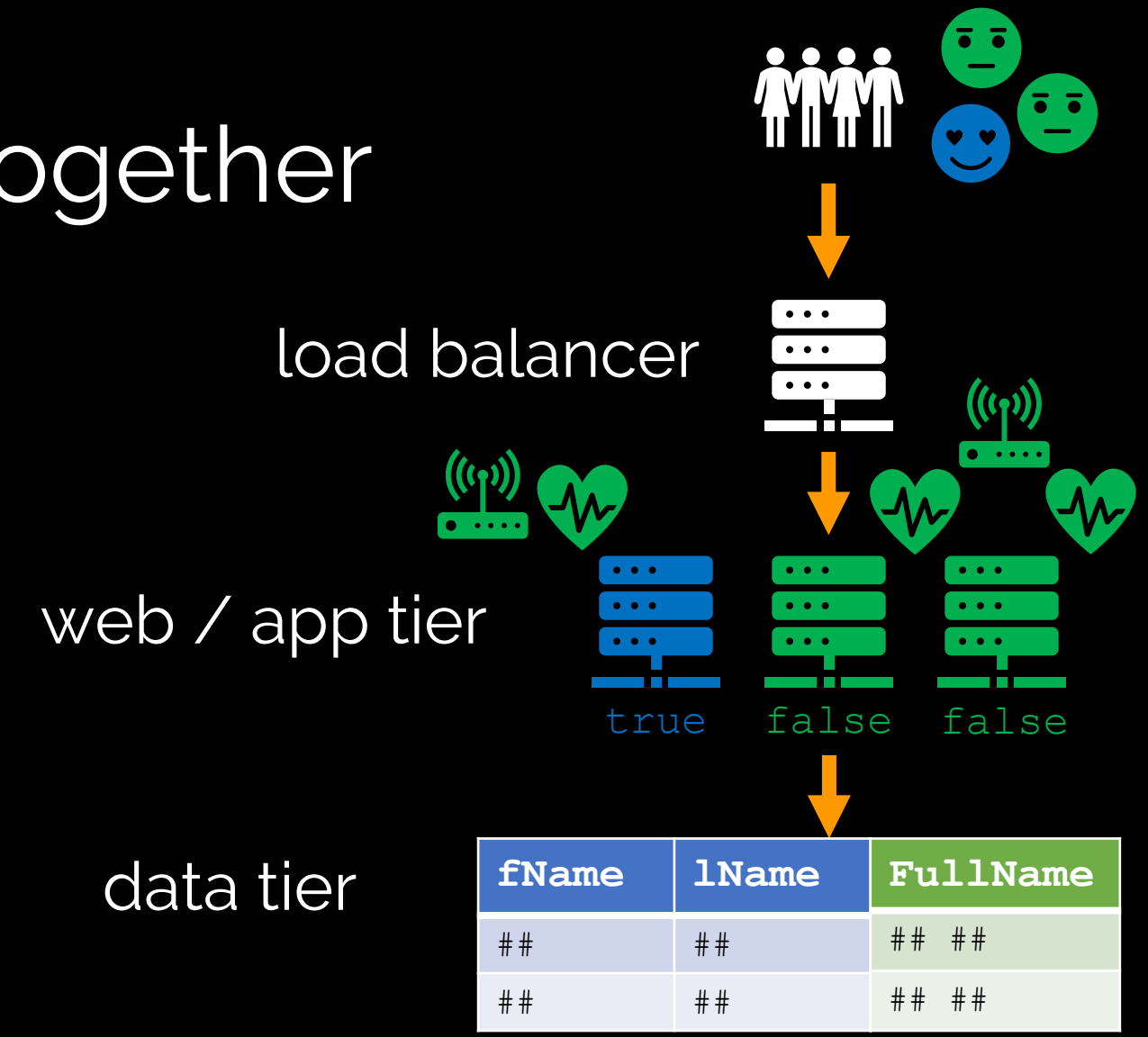


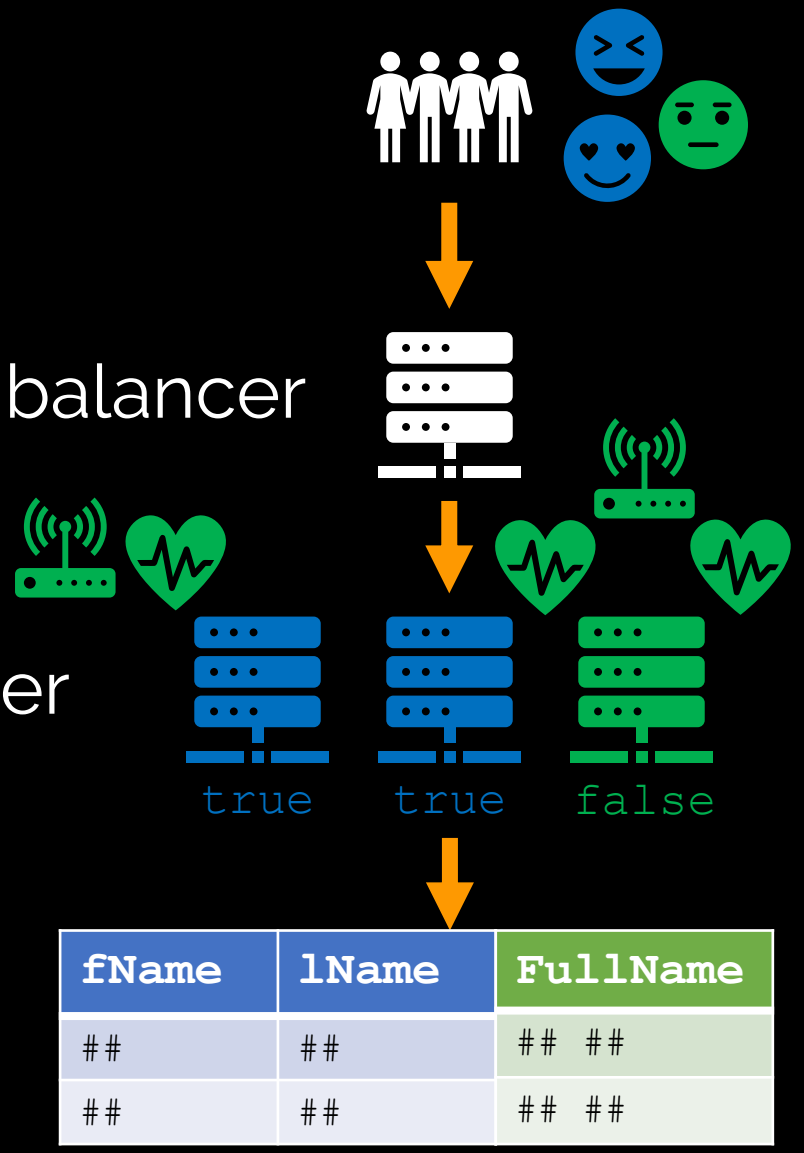
Putting it all together

1. Expand DB
2. Release canary
3. Check telemetry



Putting it all together

1. Expand DB
2. Release canary
3. Check telemetry
4. Roll out



Putting it all together

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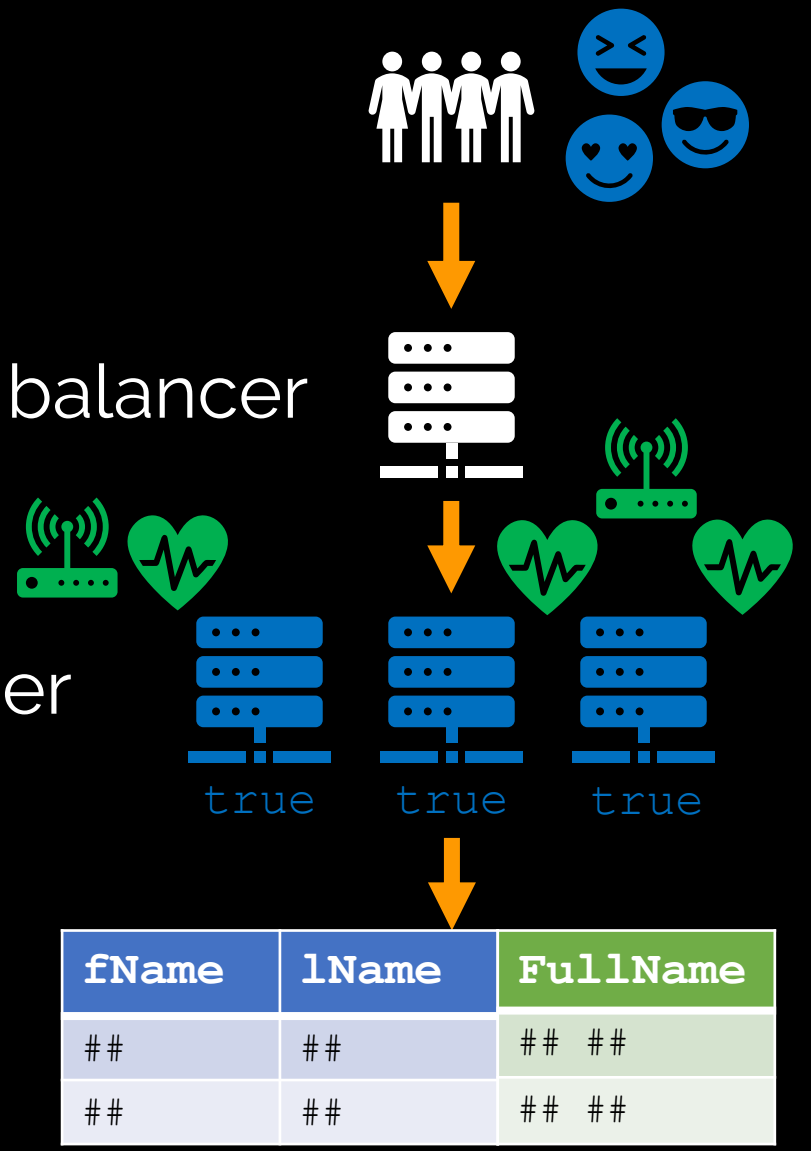
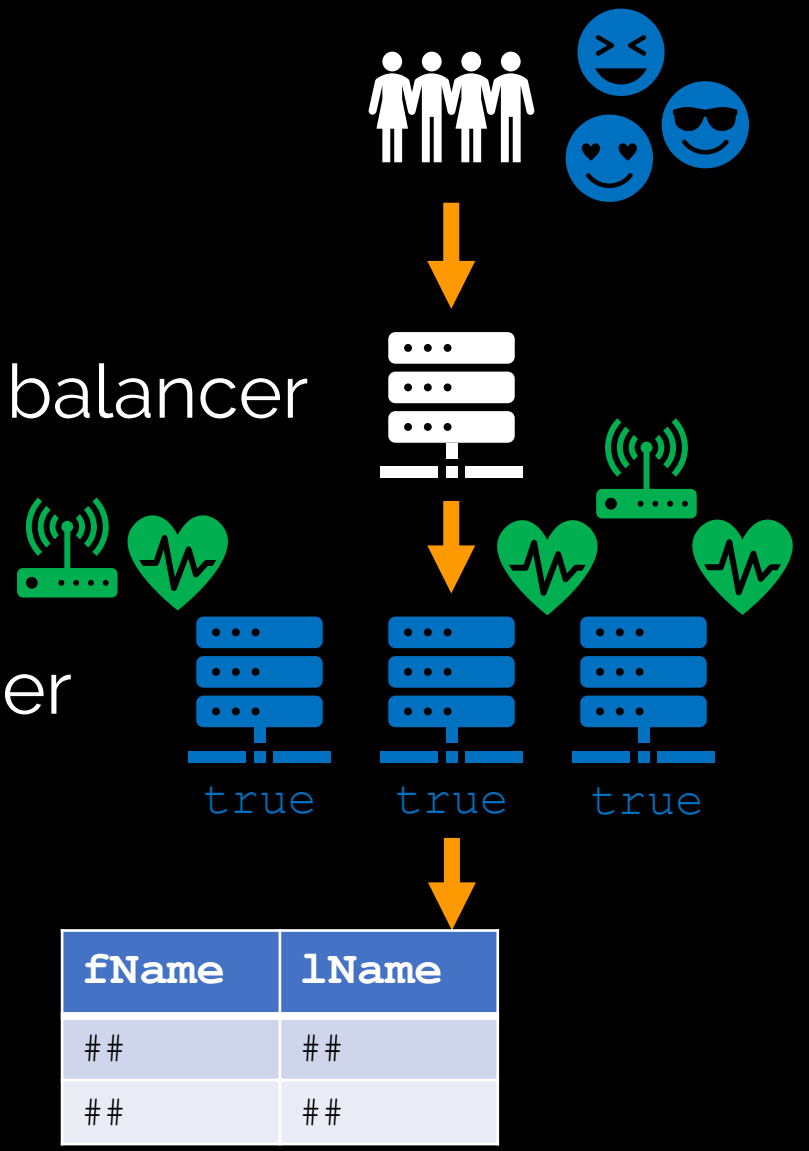
4. Roll out



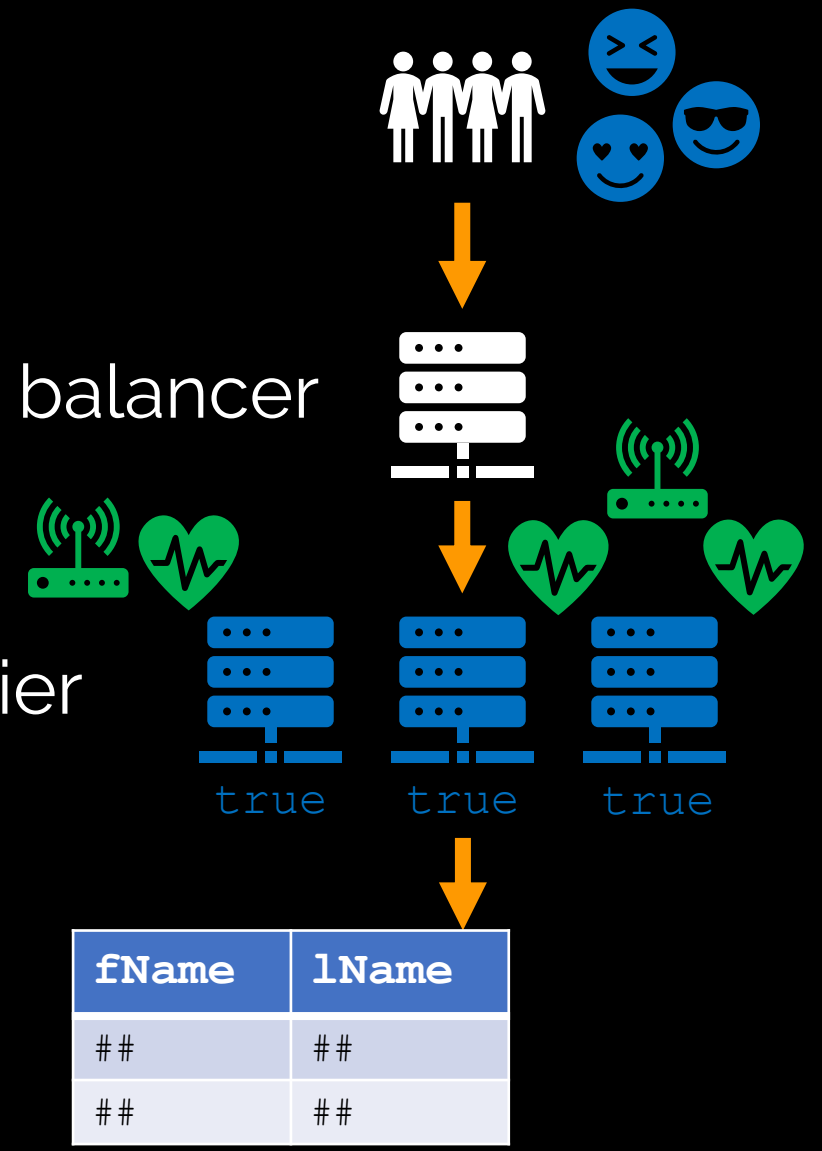
Putting it all together

1. Expand DB
2. Release canary
3. Check telemetry
4. Roll out
5. Contract DB



Putting it all together

1. Expand DB
2. Release canary
3. Check telemetry
4. Roll out
5. Contract DB (Rename first or hide behind view/sproc)



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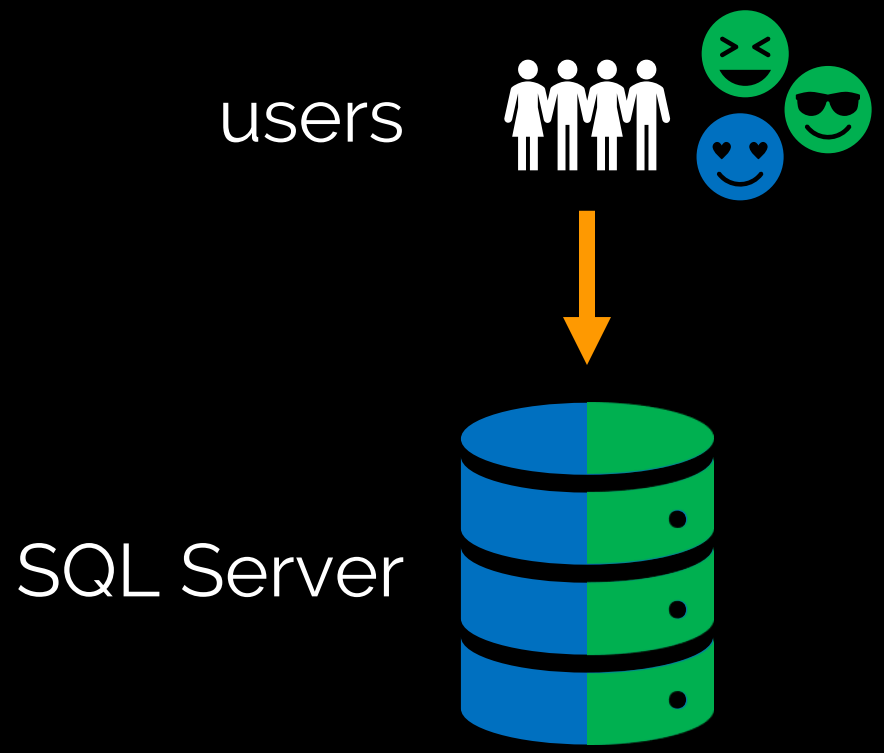
Dark launches and Feature Toggles:
SQL Server Demo!



Further reading...

Deploy != Release (Part 1)

The difference between deploy and release and why it matters.

Art Gillespie Follow
May 24, 2017 · 5 min read

Q: "Is the latest version deployed?"

A: "I deployed animated gif support to production."

Q: "So animated gif support is released?"

A: "The animated gif release is deployed."

Q: "…"

I've worked at many companies where "deploy", "deployment", "ship", and "release" are used loosely, even interchangeably. As an industry, we haven't done a great job of standardizing our use of these terms, even though we've radically improved operations practices and tooling over the past decade. At Turbine Labs, we use precise definitions of "ship", "deploy", "release", and

blog.turbinelabs.io/deploy-not-equal-release-part-one-4724bc1e726b

martinFowler.com

Refactoring Agile Architecture About ThoughtWorks

Feature Toggles (aka Feature Flags)

Feature Toggles (often also refered to as Feature Flags) are a powerful technique, allowing teams to modify system behavior without changing code. They fall into various usage categories, and it's important to take that categorization into account when implementing and managing toggles. Toggles introduce complexity. We can keep that complexity in check by using smart toggle implementation practices and appropriate tools to manage our toggle configuration, but we should also aim to constrain the number of toggles in our system.

09 October 2017

Pete Hodgson

CONTENTS

expand

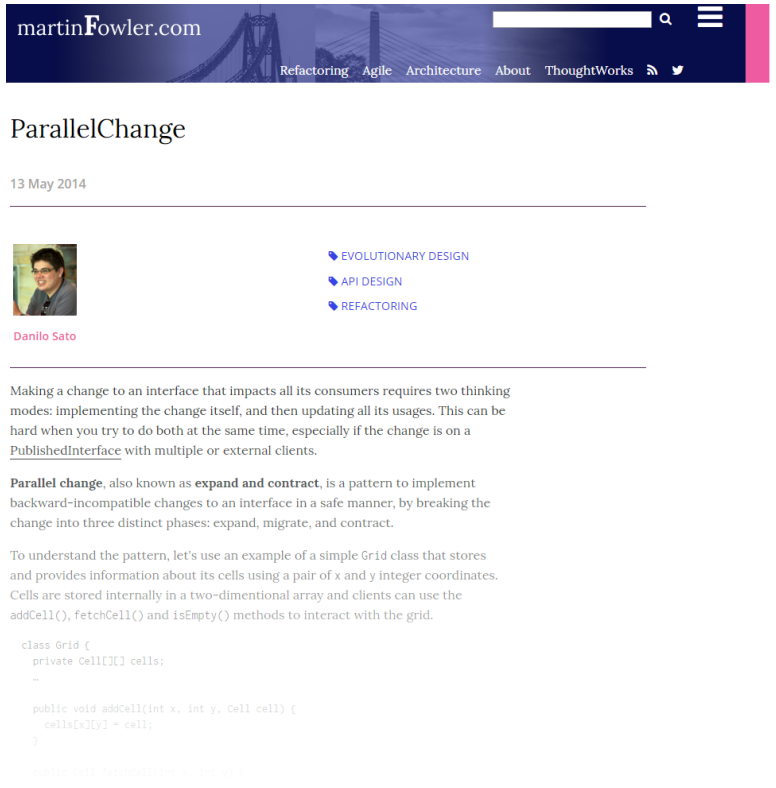
A Toggling Tale
Categories of toggles
Implementation Techniques
Toggle Configuration
Working with feature-flagged systems

Pete Hodgson is an independent software delivery consultant based in the San Francisco Bay Area. He specializes in helping startup engineering teams improve their engineering practices and technical architecture.

Pete previously spent six years as a consultant with ThoughtWorks, leading technical practices for their West Coast business. He also did several stints as a tech lead at various San Francisco startups.

POPULAR

martinfowler.com/articles/feature-toggles.html



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Refactoring Agile Architecture About ThoughtWorks

ParallelChange

13 May 2014

Danilo Sato

EVOLUTIONARY DESIGN
API DESIGN
REFACTORING

Making a change to an interface that impacts all its consumers requires two thinking modes: implementing the change itself, and then updating all its usages. This can be hard when you try to do both at the same time, especially if the change is on a PublishedInterface with multiple or external clients.

Parallel change, also known as **expand and contract**, is a pattern to implement backward-incompatible changes to an interface in a safe manner, by breaking the change into three distinct phases: expand, migrate, and contract.

To understand the pattern, let's use an example of a simple `Grid` class that stores and provides information about its cells using a pair of `x` and `y` integer coordinates. Cells are stored internally in a two-dimentional array and clients can use the `addCell()`, `fetchCell()` and `isEmpty()` methods to interact with the grid.

```
class Grid {
  private Cell[][] cells;
  …

  public void addCell(int x, int y, Cell cell) {
    cells[x][y] = cell;
  }
```

martinfowler.com/bliki/ParallelChange.html

@_AlexYates_

#DevOps

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Further reading...

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#DevOps

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