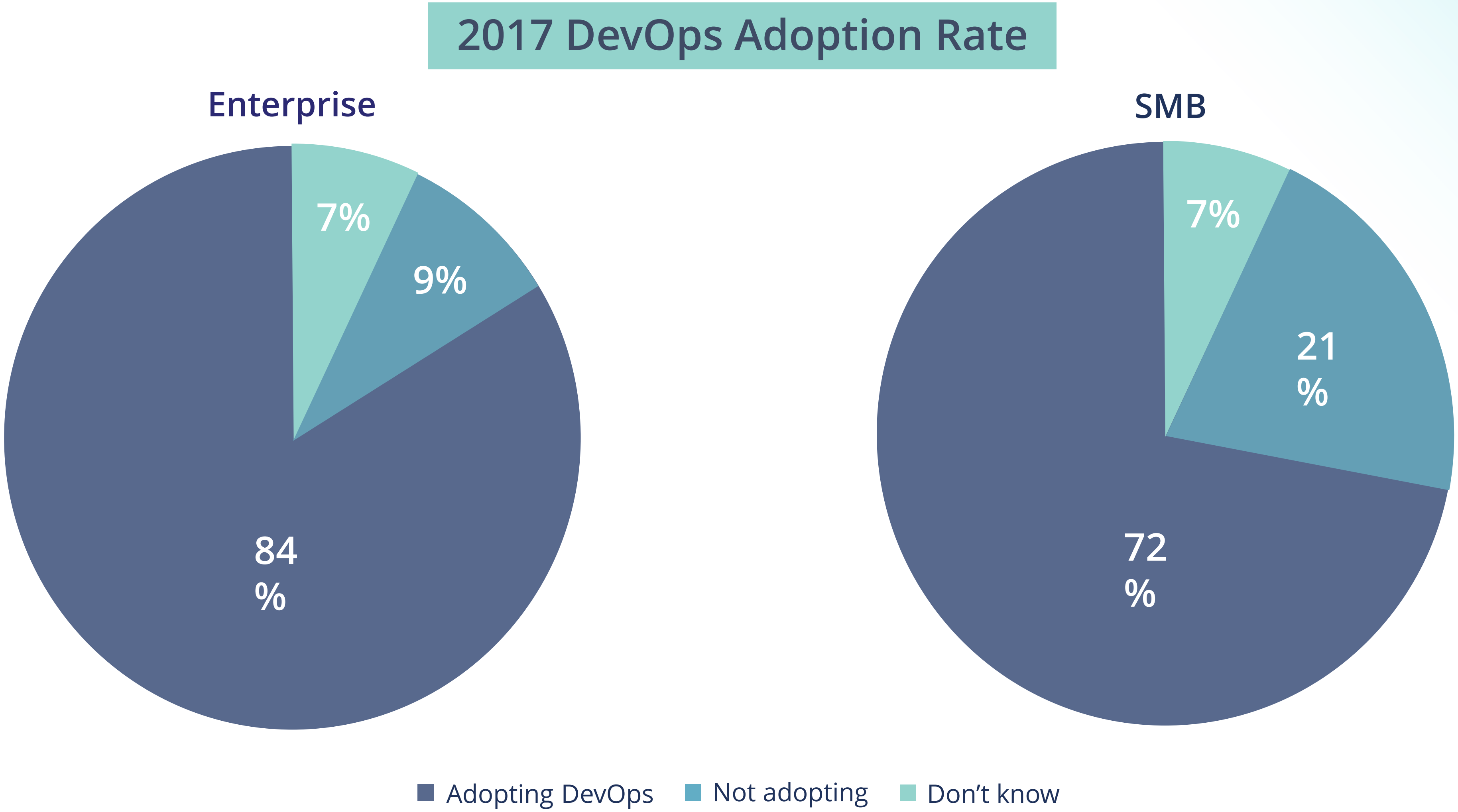
DBmaestro™

Rapid Database Automation. Zero Disruptions.

DevOps adoption is a reality



Source: RightScale 2017 State of the Cloud Report

DBmaestro

DevOps adoption – where is the Database?

Multi vendor DBs

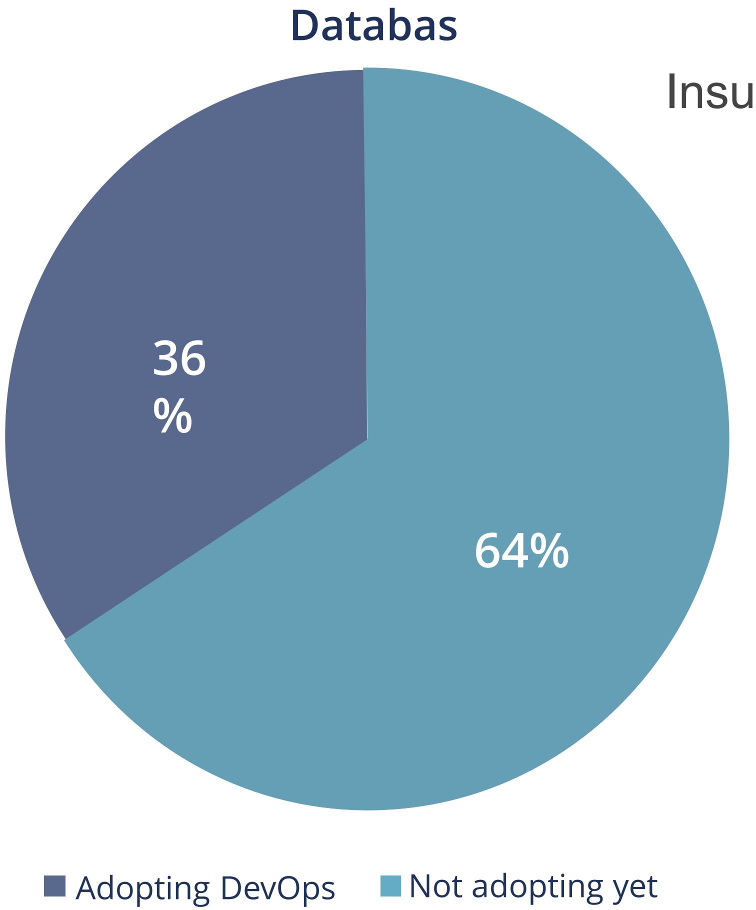
High risk

Complex challenges

Specialized professionals

Manual work

Configuration sensitive



Insufficient supporting solutions

Risk of blind automation

Compliance

Different processes

Security

Incremental changes

Source: DBmaestro 2018 Database DevOps Survey

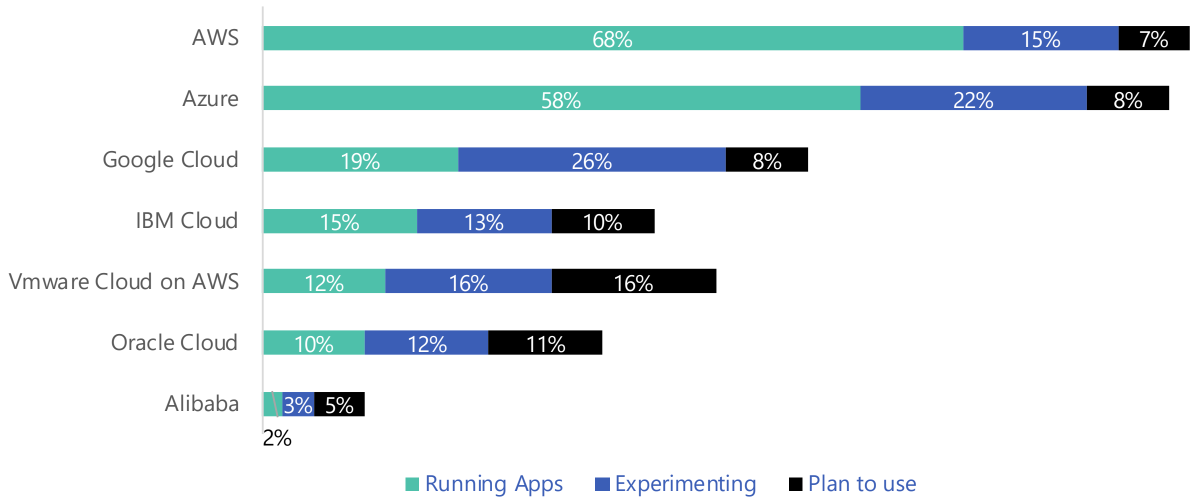
Moving faster has intensified the challenges of controlling, tracking, and auditing changes to the application and database!

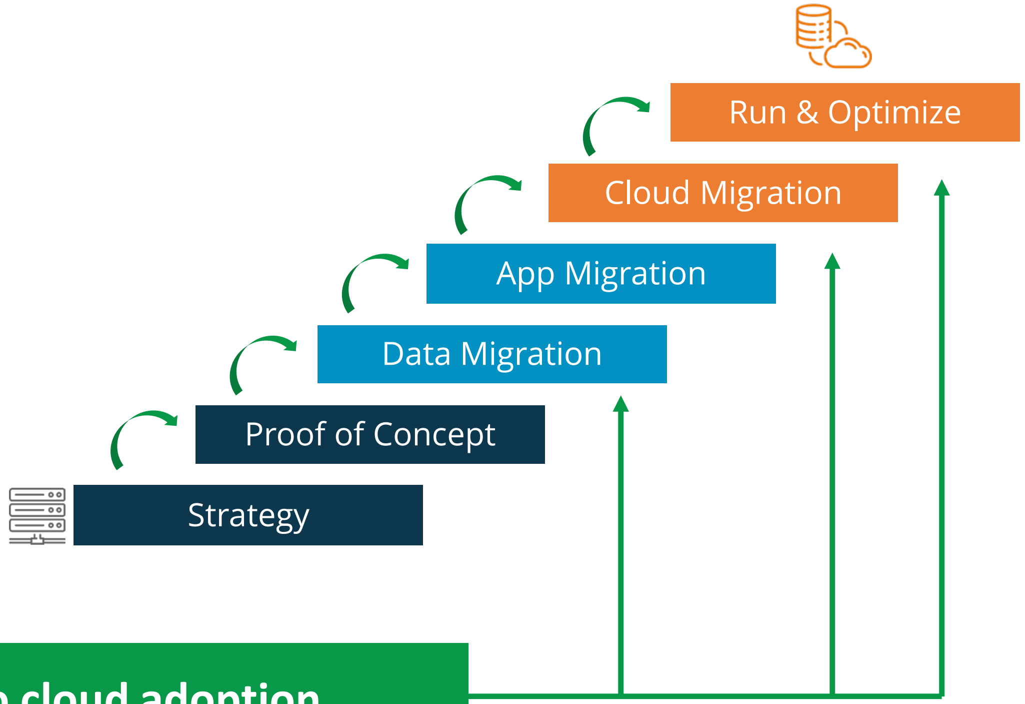
Early Innings of Massive Cloud Adoption…

Proliferation of applications is driving rapid migration to the cloud

Enterprise Public Cloud Adoption(1)

% of Respondents Running Applications

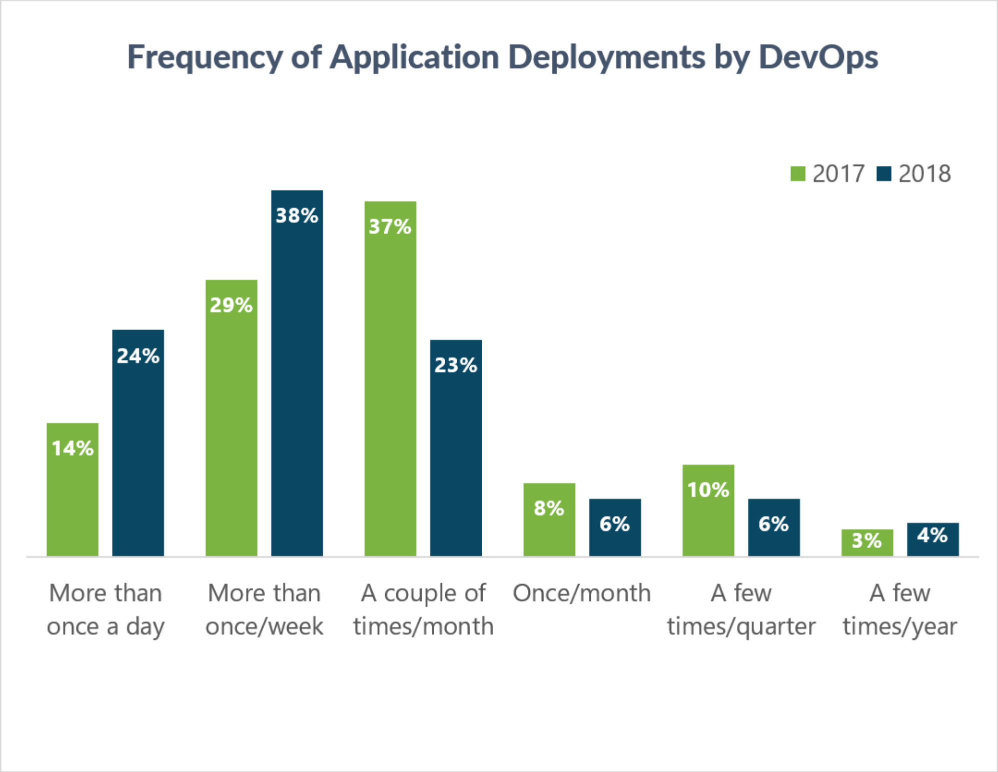




The database is critical to cloud adoption

Sources: RightScale 2018 State of the Cloud Report

Moving faster!

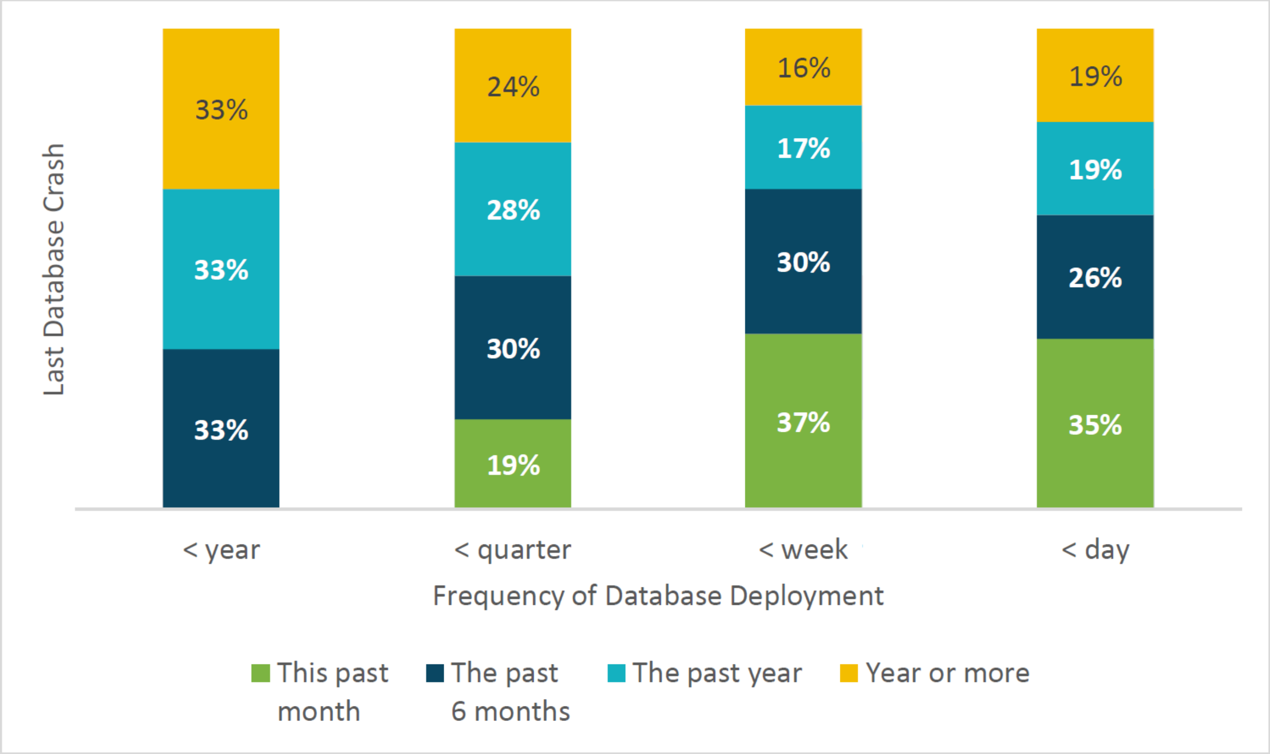


Enterprises' transition to Agile development has led to a dramatic increase in the number of releases and development cycles.

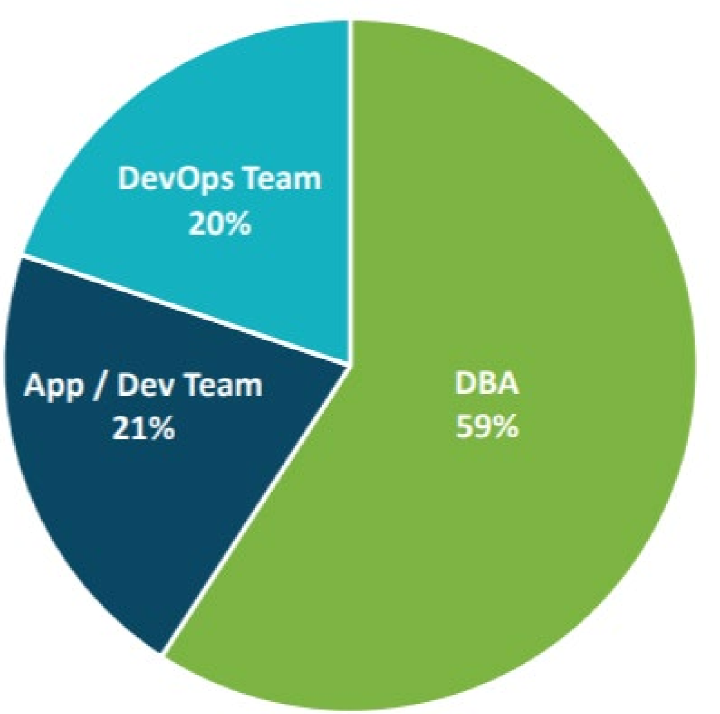
DBmaestro

Who and how often? Move fast and break things? :-/

Frequency of DB Changes vs. Last DB Crash



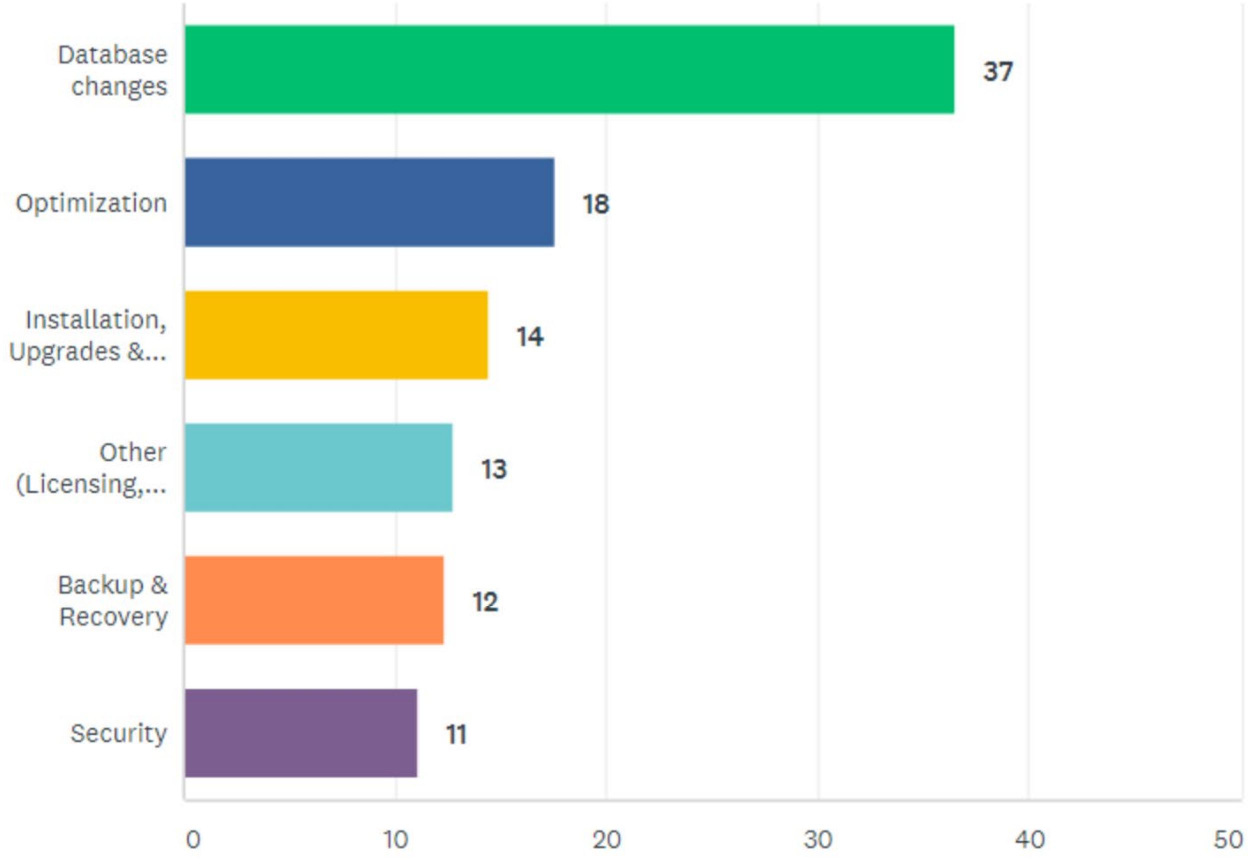
Access to Make Database Changes



Source: DBmaestro 2018 Database DevOps Survey

How DBAs Spend Their Time?

- Time is being shifted into change delivery, at the expense of security!



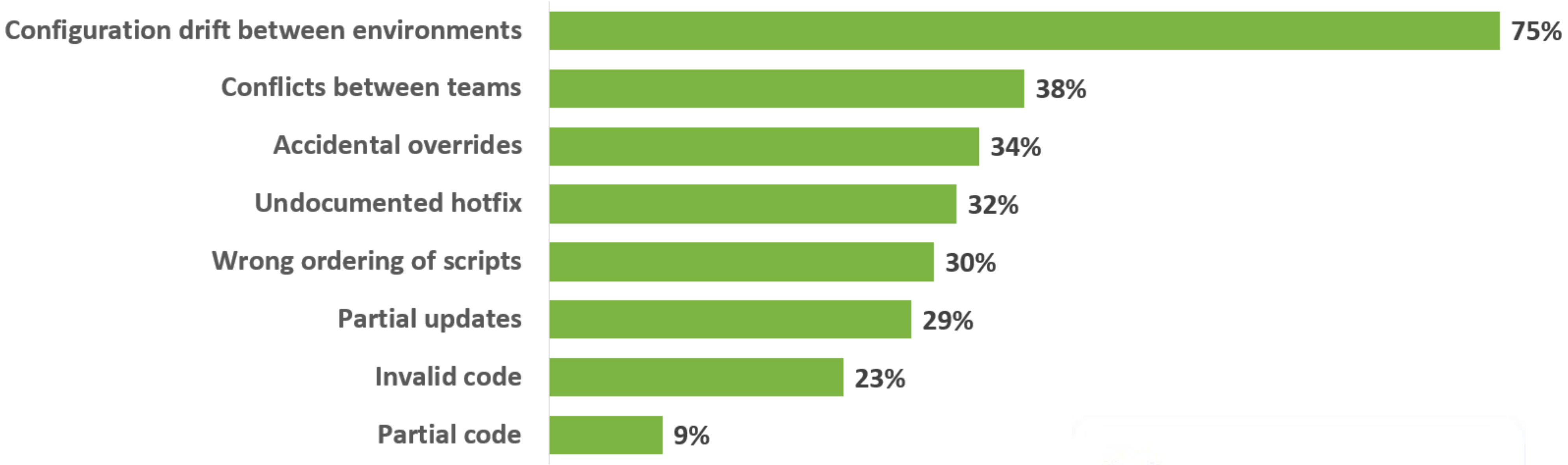
In less than two years:

- DB changes ⇧ (22% -> 27% -> 37%)
- Security ⇩ (23% -> 13% -> 11%)

Source: Early results from the DBmaestro 2020 Database DevOps Survey

What causes errors in the database?

Top reasons for failed database releases



Survey Available

Source: Early results from the DBmaestro 2019 Database DevOps Survey

Critical errors, data loss, and costly downtime

DBmaestro

Moving faster without breaking the database.

How?

- Working according to best practices
- Creating a repeatable process
- Balancing work load
- Putting security policy in place as part of the process
- Controlling who is authorized to make changes
- Controlling what changes are allowed
- Testing, testing and more testing before doing it for real
- Expecting the unexpected ☺
- Documenting everything that happens
  - (troubleshooting, compliance)

How to achieve safe DevOps for Database with DBmaestro

Introducing The Database DevOps Platform

Multi database

Oracle

MsSQL

DB2

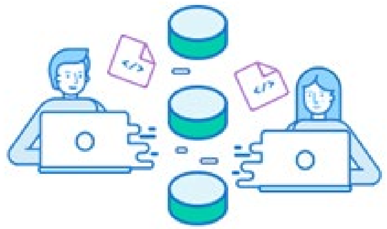
PostgreSQL

MySQL/MariaDB

Coming soon:

MongoDB

Release Automation



Version Control

Security & Governance

Business Activity Monitoring

"Move fast and break things"?

Sure! But don't break my database!!

So, move fast and ship with quality!

DBmaestro

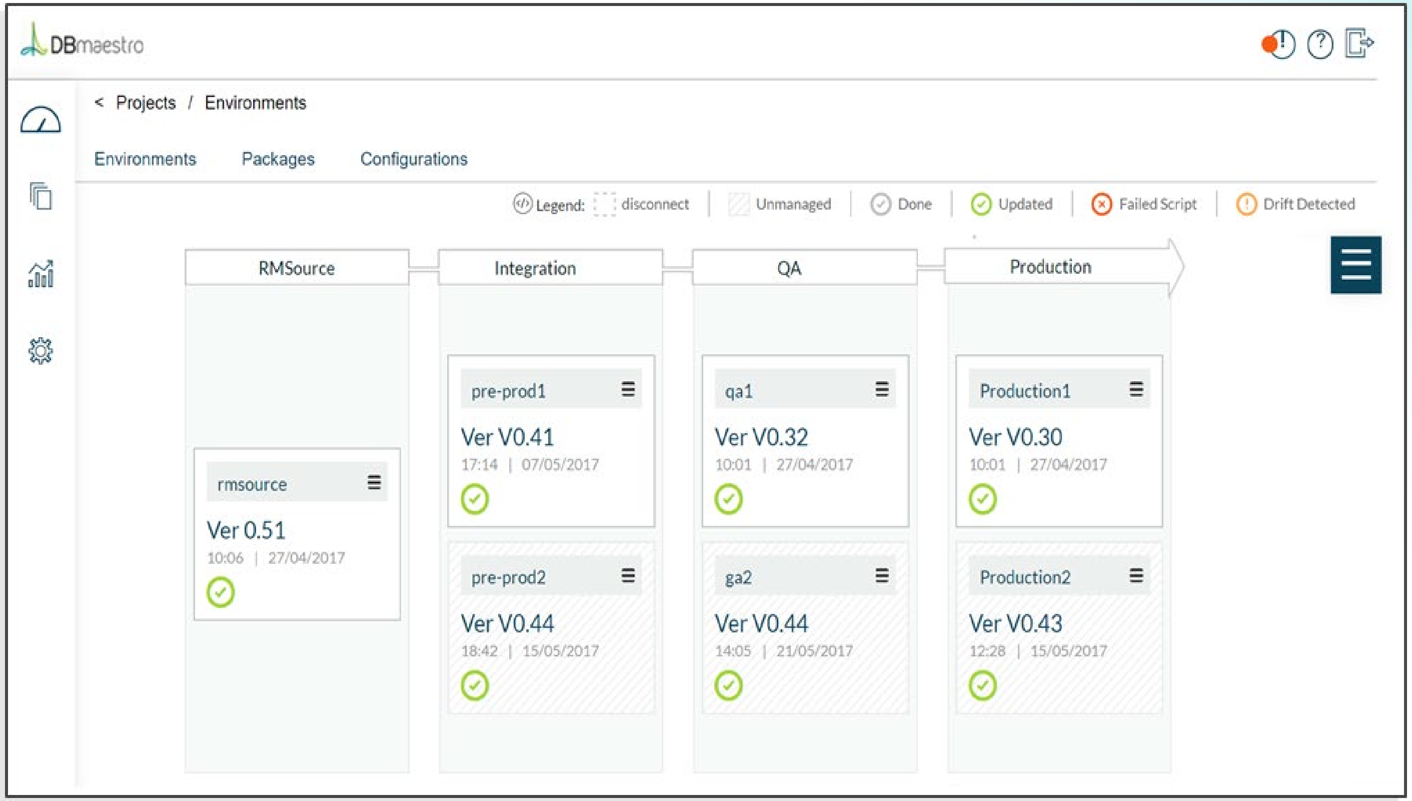
Release Pipelines - Fast, Safe, Repeatable, Scalable

White Paper Available

DevOps Best practices:

- Build once, deploy many
- Deploy the same way to all environments
- Immutable packages

- Automate DB releases
- **Risk management**
- Traceability



rmsource
Ver 0.51
10:06 | 27/04/2017

pre-prod1
Ver V0.41
17:14 | 07/05/2017

pre-prod2
Ver V0.44
18:42 | 15/05/2017

qa1
Ver V0.32
10:01 | 27/04/2017

qa2
Ver V0.44
14:05 | 21/05/2017

Production1
Ver V0.30
10:01 | 27/04/2017

Production2
Ver V0.43
12:28 | 15/05/2017

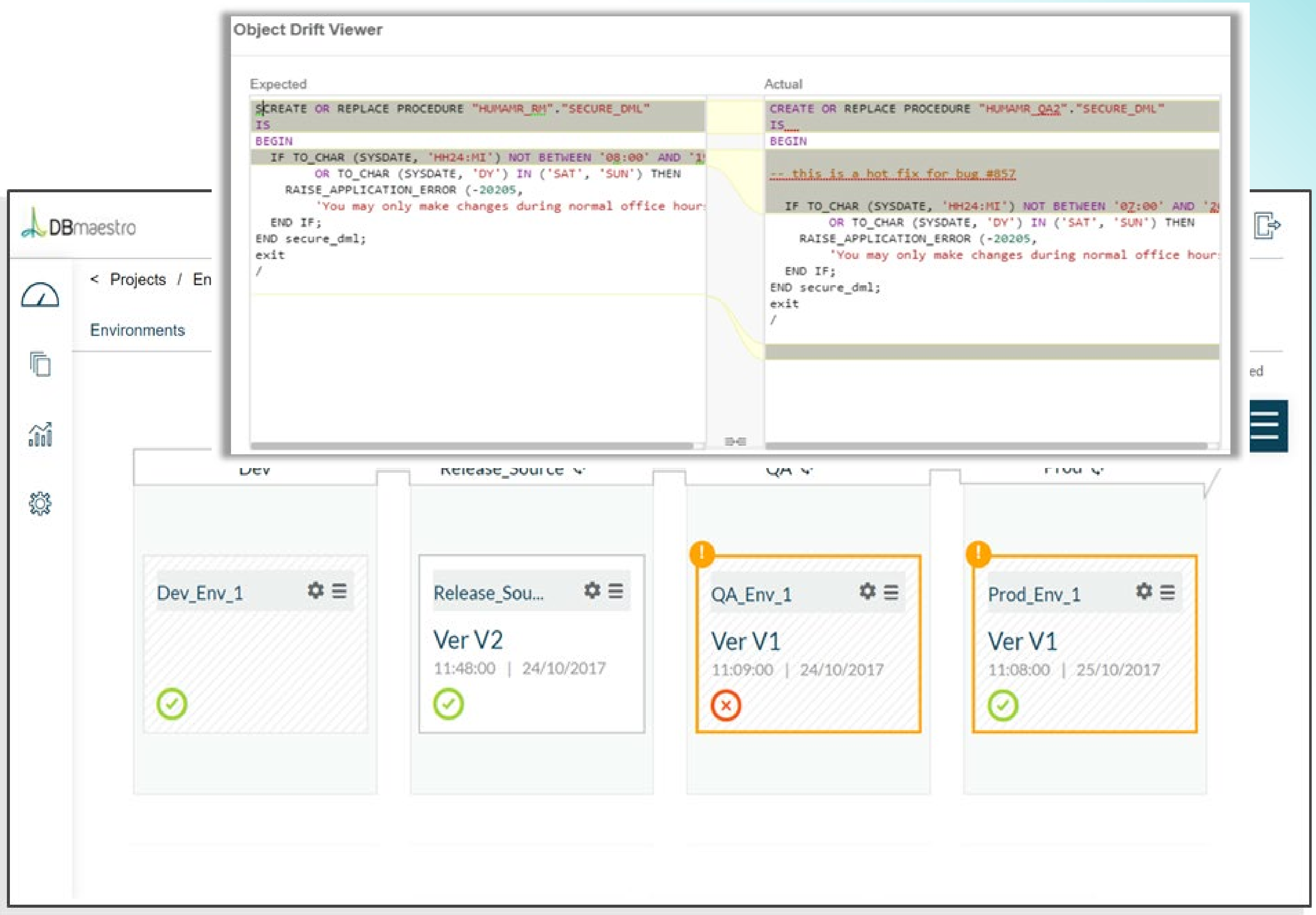
DBmaestro

Build and release automation integration

Drift Management & Code validation

- Identify and alert for 'unexpected' configuration drifts – before you break things

- DryRun and catch invalid code before it hits the DB as part of CI (syntax/SQL error etc.)



Object Drift Viewer

Expected

```
SCREATE OR REPLACE PROCEDURE "HUMAMR_RM"."SECURE_DML"
IS
BEGIN
  IF TO_CHAR (SYSDATE, 'HH24:MI') NOT BETWEEN '08:00' AND '1
        OR TO_CHAR (SYSDATE, 'DY') IN ('SAT', 'SUN') THEN
    RAISE_APPLICATION_ERROR (-20205,
        'You may only make changes during normal office hour
  END IF;
END secure_dml;
exit
/
```

Actual

```
CREATE OR REPLACE PROCEDURE "HUMAMR_QA2"."SECURE_DML"
IS
BEGIN

-- this is a hot fix for bug #857

  IF TO_CHAR (SYSDATE, 'HH24:MI') NOT BETWEEN '07:00' AND '2
        OR TO_CHAR (SYSDATE, 'DY') IN ('SAT', 'SUN') THEN
    RAISE_APPLICATION_ERROR (-20205,
        'You may only make changes during normal office hour
  END IF;
END secure_dml;
exit
/
```

Dev	Release_Source	QA	Prod
Dev_Env_1	Release_Sou...	QA_Env_1	Prod_Env_1
	Ver V2	Ver V1	Ver V1
	11:48:00 | 24/10/2017	11:09:00 | 24/10/2017	11:08:00 | 25/10/2017
✓	✓	✗	✓

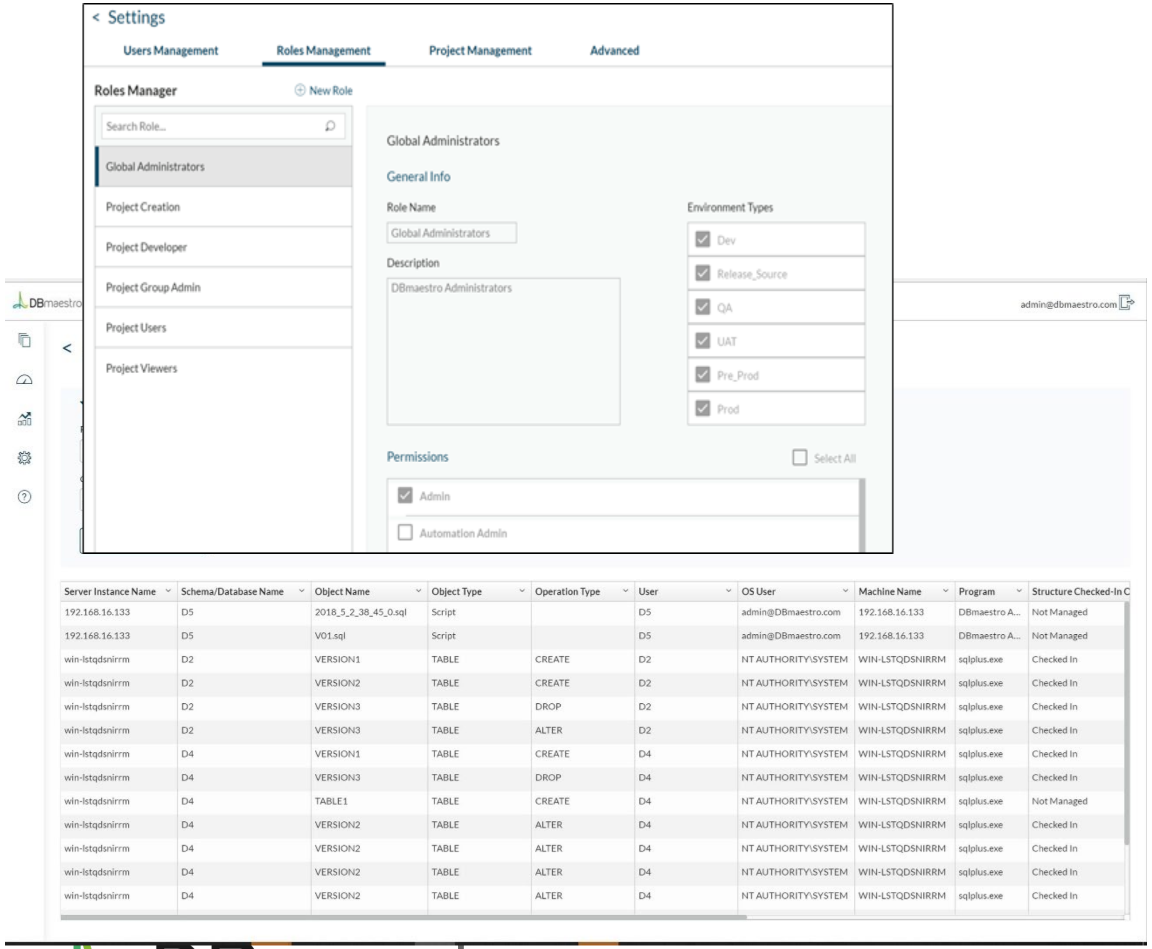
DBmaestro

Certified backout plan and auto recovery

- Upgrade / downgrade release pairs
- Certified backout plan
  - DryRun upgrade release package
  - DryRun downgrade release package
  - Validate that both are working together as expected and restore DB to original state
- Smart backup
  - Environment aware, stack controlled
  - Policy based
  - Auto recovery when needed
    - Upon failed upgrades
    - Upon failed tests

Complete Security, Policy and Compliance

Enforce organizational policy, manage roles and permissions



Global Administrators
Project Creation
Project Developer
Project Group Admin
Project Users
Project Viewers

Global Administrators

General Info

Role Name: Global Administrators

Description: DBmaestro Administrators

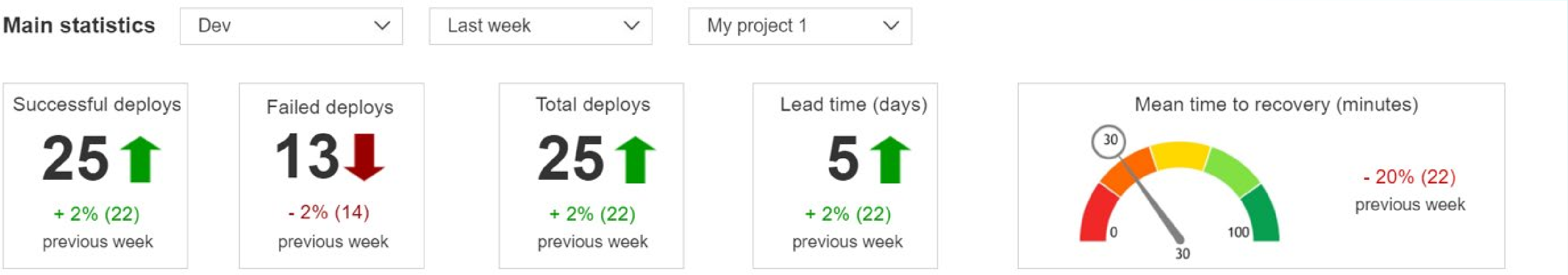
Environment Types
☑ Dev
☑ Release_Source
☑ QA
☑ UAT
☑ Pre_Prod
☑ Prod

Permissions □ Select All
☑ Admin
□ Automation Admin

Server Instance Name	Schema/Database Name	Object Name	Object Type	Operation Type	User	OS User	Machine Name	Program	Structure Checked-In C
192.168.16.133	D5	2018_5_2_38_45_0.sql	Script		D5	admin@DBmaestro.com	192.168.16.133	DBmaestro A...	Not Managed
192.168.16.133	D5	V01.sql	Script		D5	admin@DBmaestro.com	192.168.16.133	DBmaestro A...	Not Managed
win-lstqdsnirrm	D2	VERSION1	TABLE	CREATE	D2	NT AUTHORITY\SYSTEM	WIN-LSTQDSNIRRM	sqlplus.exe	Checked In
win-lstqdsnirrm	D2	VERSION2	TABLE	CREATE	D2	NT AUTHORITY\SYSTEM	WIN-LSTQDSNIRRM	sqlplus.exe	Checked In
win-lstqdsnirrm	D2	VERSION3	TABLE	DROP	D2	NT AUTHORITY\SYSTEM	WIN-LSTQDSNIRRM	sqlplus.exe	Checked In
win-lstqdsnirrm	D2	VERSION3	TABLE	ALTER	D2	NT AUTHORITY\SYSTEM	WIN-LSTQDSNIRRM	sqlplus.exe	Checked In
win-lstqdsnirrm	D4	VERSION1	TABLE	CREATE	D4	NT AUTHORITY\SYSTEM	WIN-LSTQDSNIRRM	sqlplus.exe	Checked In
win-lstqdsnirrm	D4	VERSION3	TABLE	DROP	D4	NT AUTHORITY\SYSTEM	WIN-LSTQDSNIRRM	sqlplus.exe	Checked In
win-lstqdsnirrm	D4	TABLE1	TABLE	CREATE	D4	NT AUTHORITY\SYSTEM	WIN-LSTQDSNIRRM	sqlplus.exe	Not Managed
win-lstqdsnirrm	D4	VERSION2	TABLE	ALTER	D4	NT AUTHORITY\SYSTEM	WIN-LSTQDSNIRRM	sqlplus.exe	Checked In
win-lstqdsnirrm	D4	VERSION2	TABLE	ALTER	D4	NT AUTHORITY\SYSTEM	WIN-LSTQDSNIRRM	sqlplus.exe	Checked In
win-lstqdsnirrm	D4	VERSION2	TABLE	ALTER	D4	NT AUTHORITY\SYSTEM	WIN-LSTQDSNIRRM	sqlplus.exe	Checked In
win-lstqdsnirrm	D4	VERSION2	TABLE	ALTER	D4	NT AUTHORITY\SYSTEM	WIN-LSTQDSNIRRM	sqlplus.exe	Checked In

- Control changes and types of changes made to databases
- Enforce roles, responsibilities and policies
- Prevent unauthorized and non-policy changes to your database
- Produce a deep audit trail that outlines all database activities and changes

KPI and scorecards – measure to improve



Main statistics

Dev

Last week

My project 1

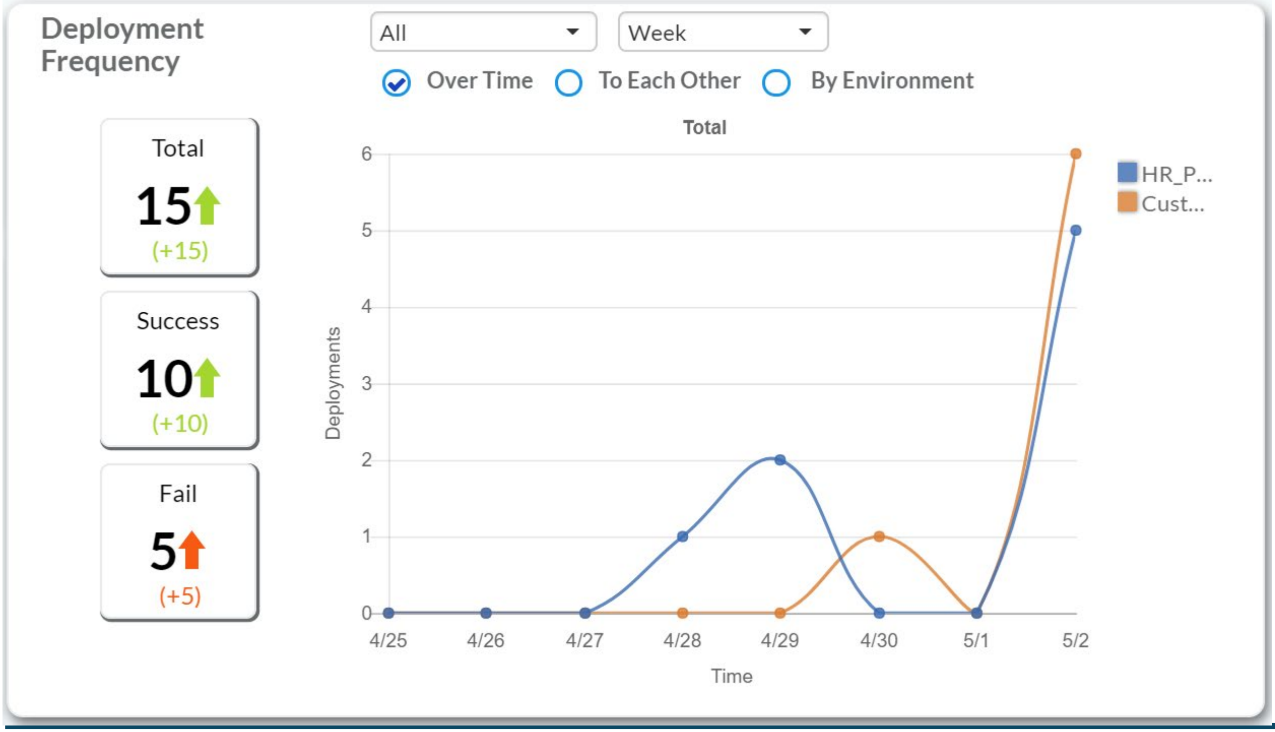
Successful deploys
25
+ 2% (22)
previous week

Failed deploys
13
- 2% (14)
previous week

Total deploys
25
+ 2% (22)
previous week

Lead time (days)
5
+ 2% (22)
previous week

Mean time to recovery (minutes)
- 20% (22)
previous week



Deployment Frequency

All

Week

☑ Over Time ○ To Each Other ○ By Environment

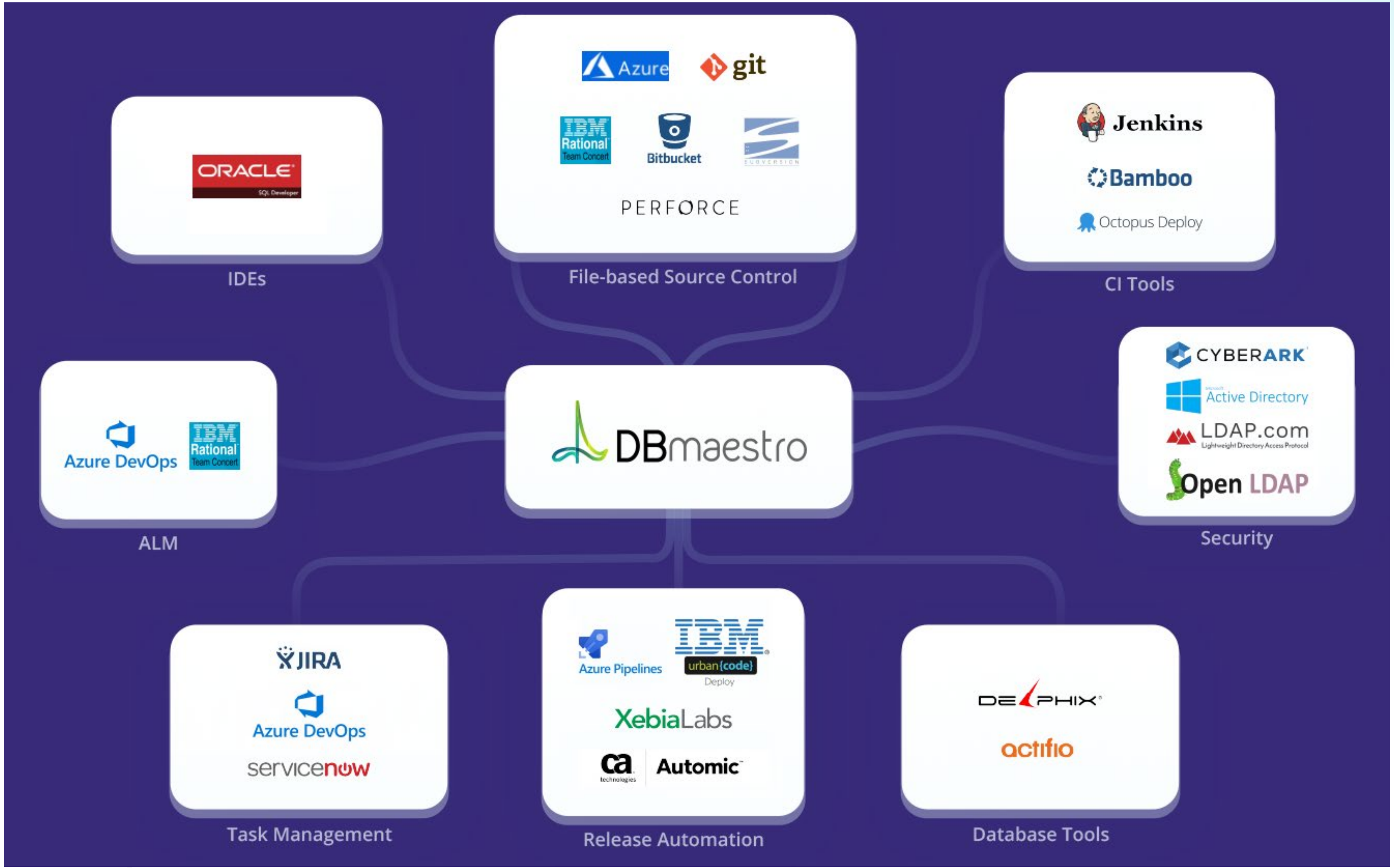
Total
15
(+15)

Success
10
(+10)

Fail
5
(+5)

DBmaestro

DBmaestro Works Within the DevOps Ecosystem



IDEs

File-based Source Control

CI Tools

ALM

Security

Task Management

Release Automation

Database Tools

Significant Commercial Traction

Global enterprise customer base spanning numerous verticals

Customers

Financial Services

- ING
- ADP
- Eaton Vance
- BBVA
- sura ASSET MANAGEMENT
- BANK FOR INTERNATIONAL SETTLEMENTS
- VISA
- UMTB MIZRAHI TEFAHOT BANK LTD

Insurance

- Allianz
- Anthem BlueCross
- Genworth
- The Hanover Insurance Group
- Lincoln Financial Group
- THE HARTFORD

Other

- GM
- T · · Mobile ·
- CGI
- Pace Analytical
- THE STARS GROUP
- Bezeq International

Partners

IT / Technology

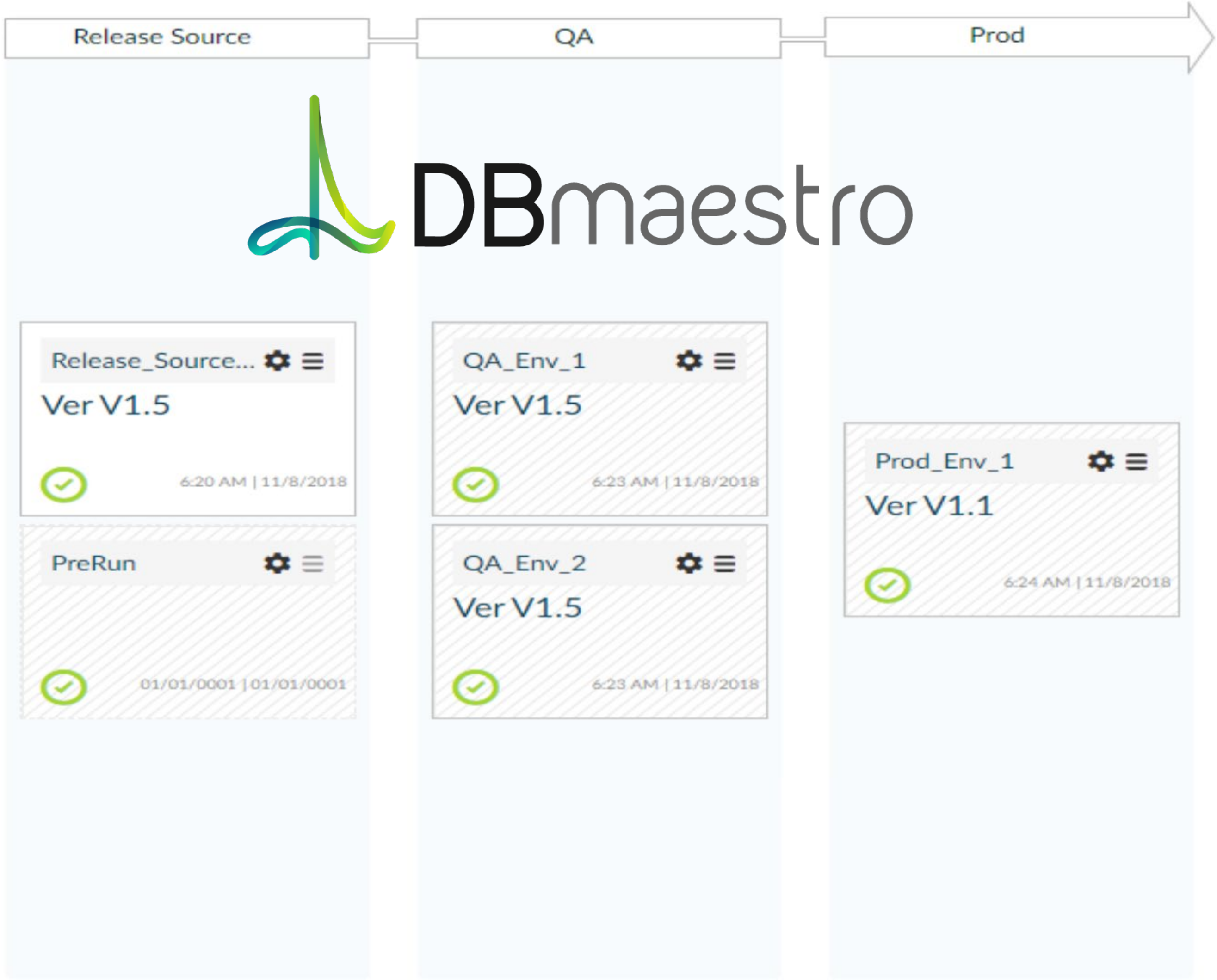
- IBM Distributor
- Capgemini
- Microsoft
- Cognizant

DBmaestro

Quick onboarding, fast ROI, zero disruption

git

JIRA



Release Source | QA | Prod

DBmaestro

Release_Source...
Ver V1.5
6:20 AM | 11/8/2018

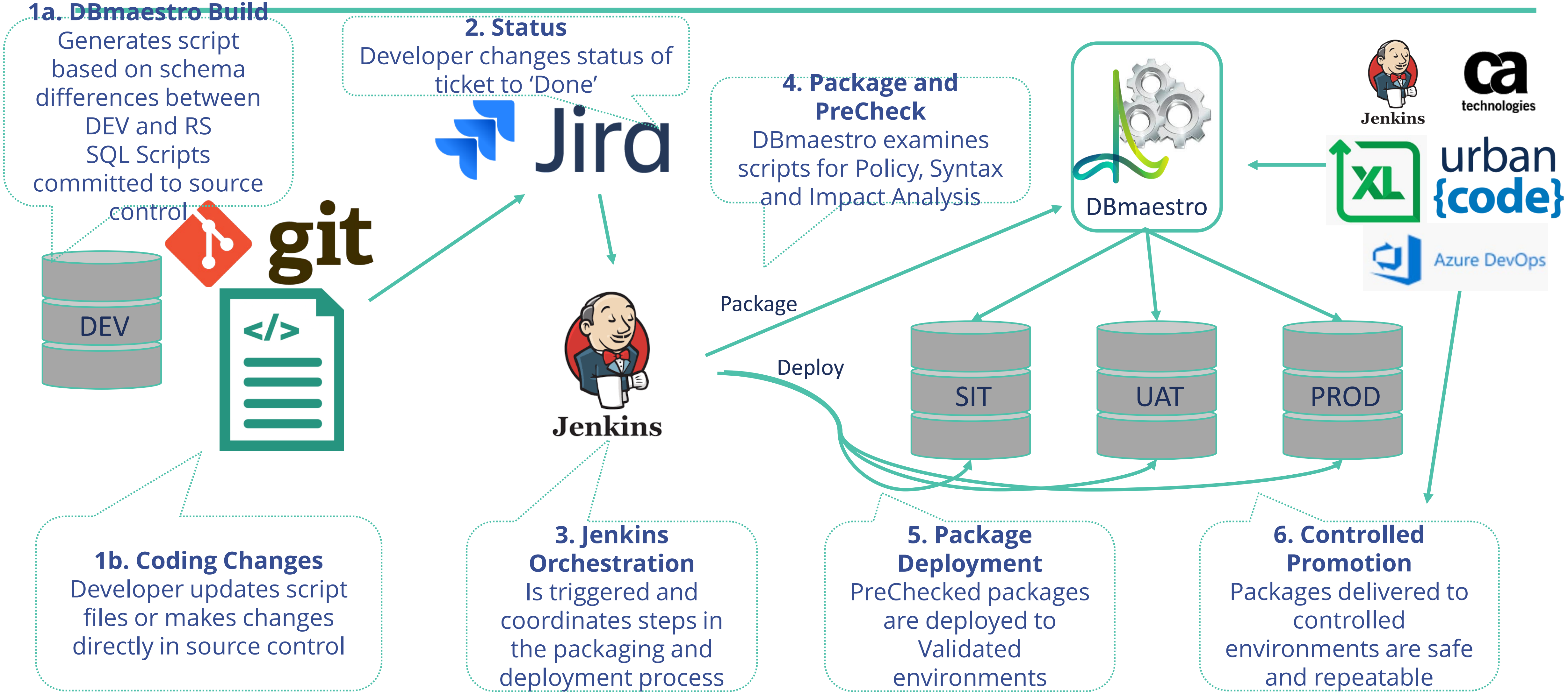
PreRun
01/01/0001 | 01/01/0001

QA_Env_1
Ver V1.5
6:23 AM | 11/8/2018

QA_Env_2
Ver V1.5
6:23 AM | 11/8/2018

Prod_Env_1
Ver V1.1
6:24 AM | 11/8/2018

Automated End-to-End Process



1a. DBmaestro Build
Generates script based on schema differences between DEV and RS
SQL Scripts committed to source control

2. Status
Developer changes status of ticket to 'Done'

4. Package and PreCheck
DBmaestro examines scripts for Policy, Syntax and Impact Analysis

1b. Coding Changes
Developer updates script files or makes changes directly in source control

3. Jenkins Orchestration
Is triggered and coordinates steps in the packaging and deployment process

5. Package Deployment
PreChecked packages are deployed to Validated environments

6. Controlled Promotion
Packages delivered to controlled environments are safe and repeatable

Quick onboarding: step by step

- Zero disruption:
  - Developers are assigned with a task, check code into Git and associate changes with the Jira ticket
  - When done, Jira ticket status is changed to ‘dev done’
  - No change to existing process
- Jenkins is triggered as a result of ticket status change and trigger a DBmaestro process:
  - DBmaestro ‘packages’ the code into a releasable unit
  - DBmaestro ‘pre checks’ the unit – check and alert for policy violations
  - DBmaestro ‘upgrades’ the database when required (immediate CI, or according to planned release schedule)