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A day in the life of a Db2 for z/OS schema

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Agenda

- Introduction
- "… the times they are a changin … " (B. Dylan)
- Schema development then, now and tomorrow
- Technology overview
- What could a day look like…
- Questions

Let me quickly introduce myself

- Toine Michielse, born in The Netherlands
  - Db2 programmer, DBA,
    System Engineer, Architect

- Worked for many years for IBM
  as Db2 for z/OS Lab Advocate

- Came to Madrid from Switzerland
  - Busy learning Spanish (and padel)

My passions:

Db2, data, ***mainframe modernization***

Paragliding

Playing drums with “Ciencia Urbana”

“the times they are a changin”

(Bob Dylan)

1964

Trivia question:

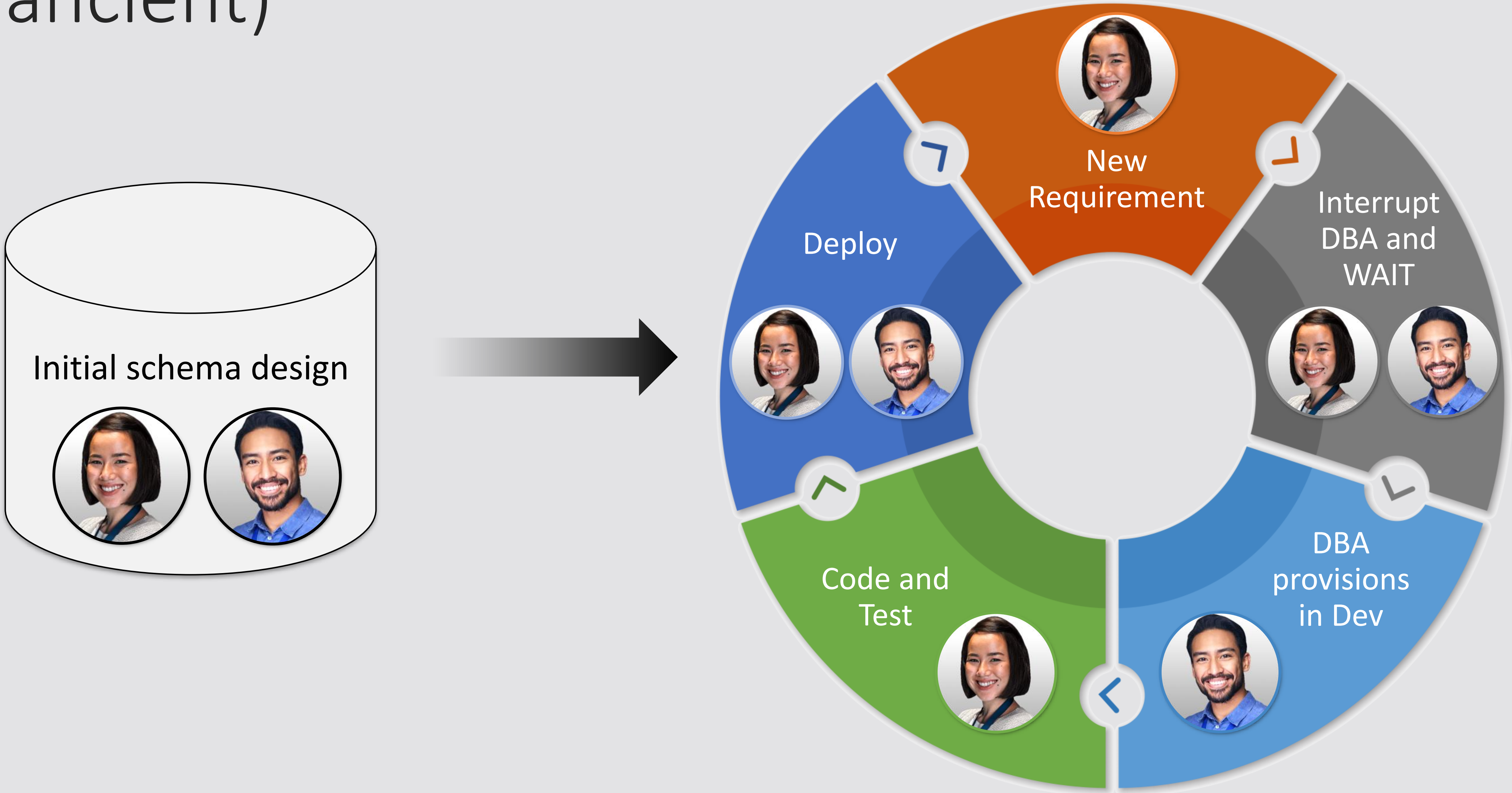
What else happened in the year this song was released?

I couldn’t have said it better than Bob Dylan

“Come gather ‘round people
Wherever you roam
And admit that the waters
Around you have grown
And accept it that soon
You'll be drenched to the bone
If your time to you is worth savin’
And you better start swimmin’
Or you'll sink like a stone

For the times they are a-changin’

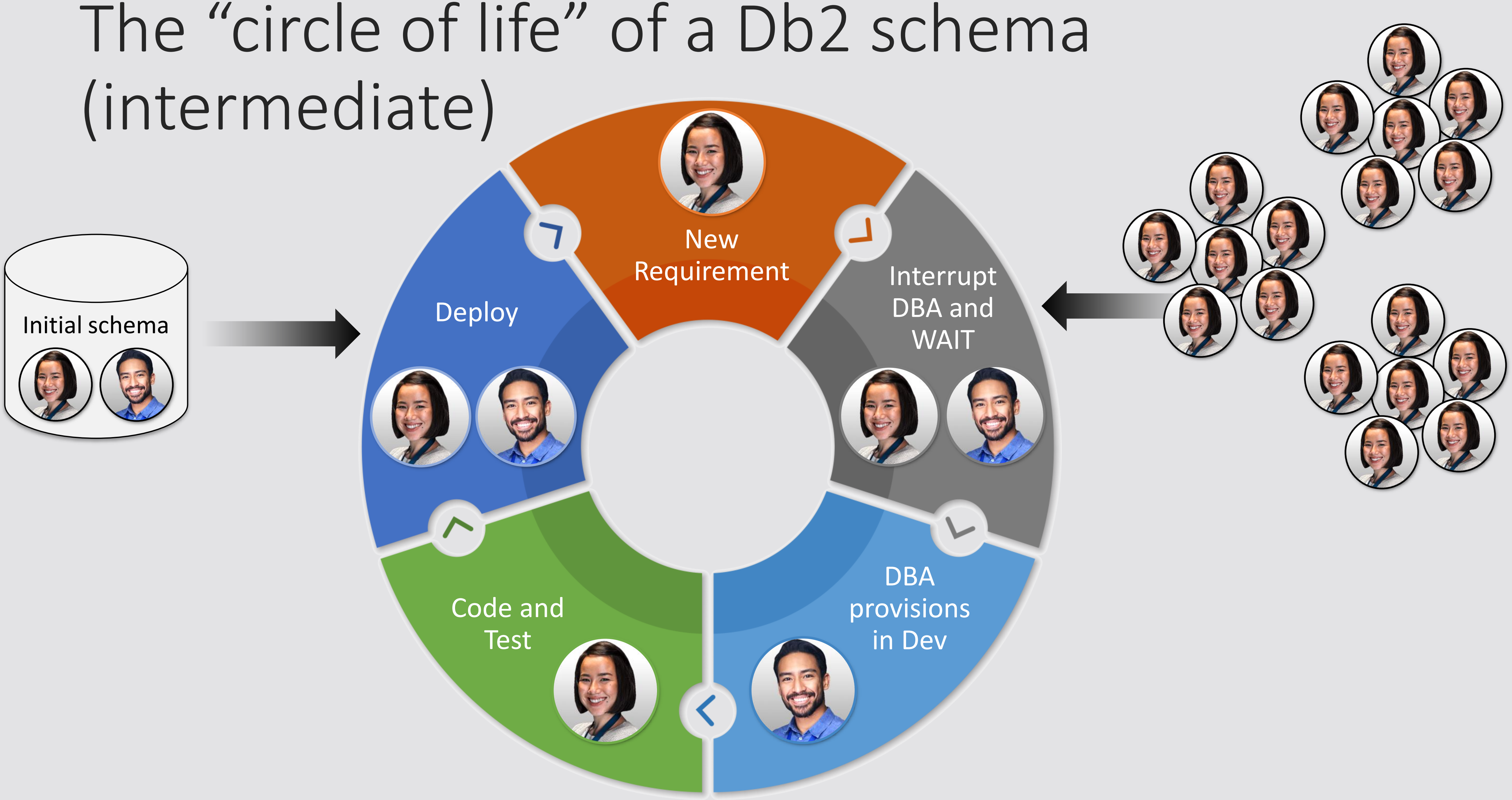
The “circle of life” of a Db2 schema (ancient)



Characteristics

- Development methodology: Waterfall
- Schema changes were difficult to implement
  - There were far more IMS databases around
  - Db2 online schema change … well not really
  - Outages were typically required
  - Careful coordination with application changes
- Development environments often shared
- Changes typically came in releases
  - Tooling and processes were adjusted to this

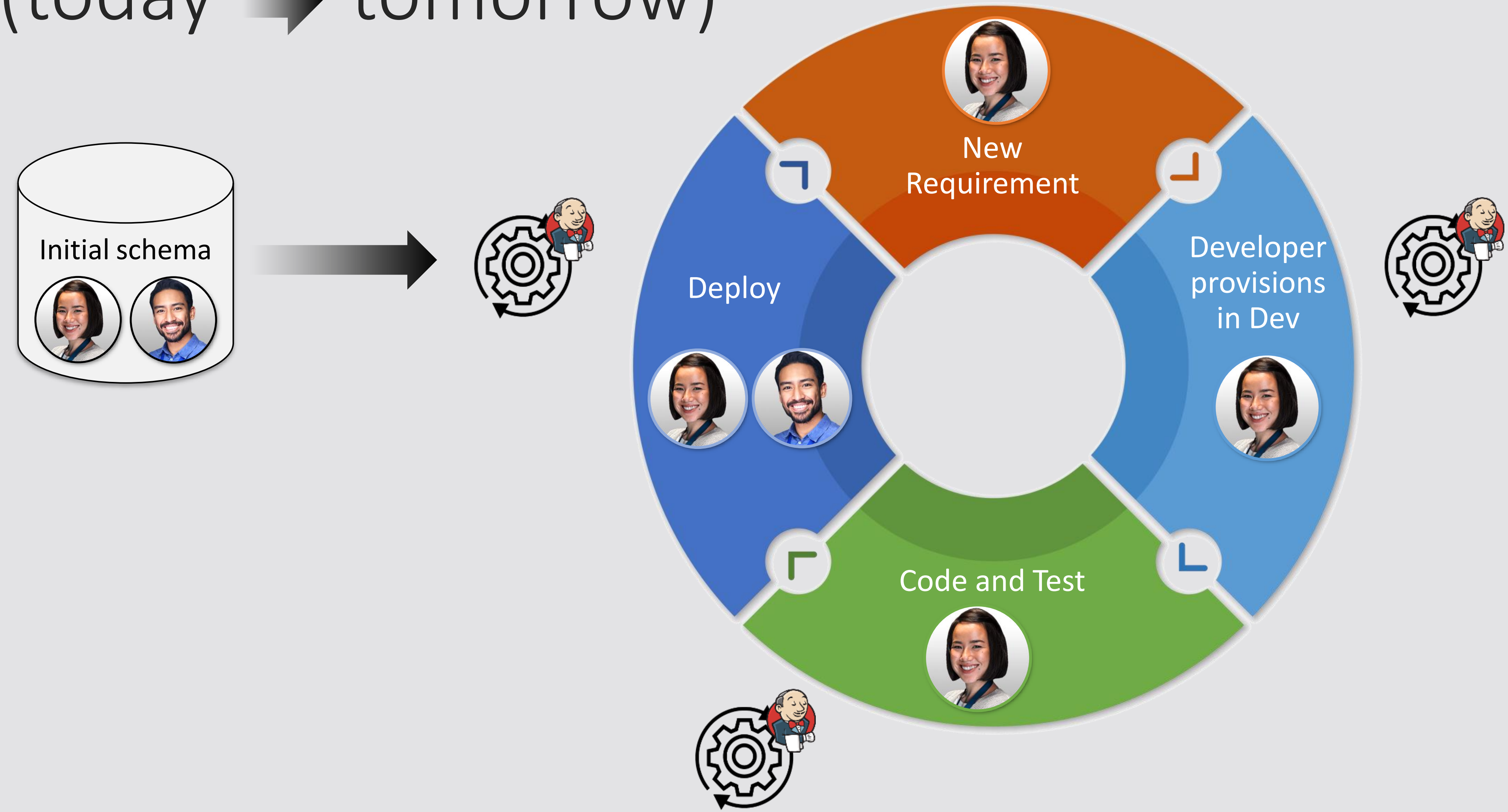
The “circle of life” of a Db2 schema (intermediate)



Characteristics

- Development methodology: Agile
- Schema changes are much easier to implement
  - Db2 online schema change has matured
  - Outages can typically be avoided
  - Some coordination with application changes needed
- Developers have their own schema
- Growing pressure on shrinking Dba workforce
- Cross-platform applications start to appear
  - Non-mainframe developers accessing mainframe data

The “circle of life” of a Db2 schema (today → tomorrow)



Initial schema

New Requirement

Developer provisions in Dev

Code and Test

Deploy

Characteristics

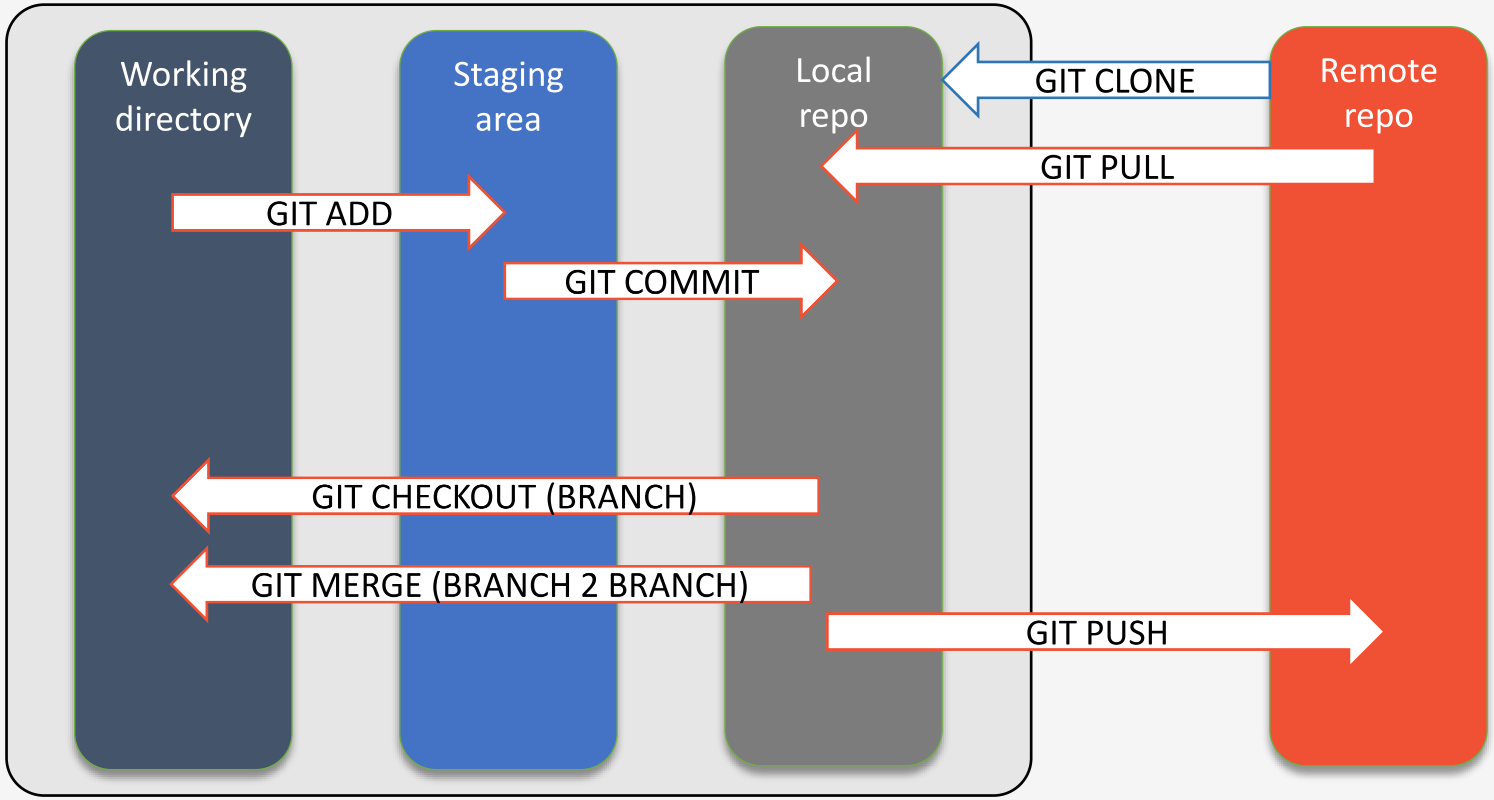
- Development methodology: Agile
    - Delivery CI/CD
- Schema changes are easy to implement
    - Db2 online schema change has matured
    - Db2 for z/OS has become very robust and forgiving
- Development teams have their own schema and schema development
- Automation is key and testing are key!!!!
- Cross-platform applications norm rather than exception
    - We are really looking for ways to integrate non-mainframe with mainframe-based services and resources

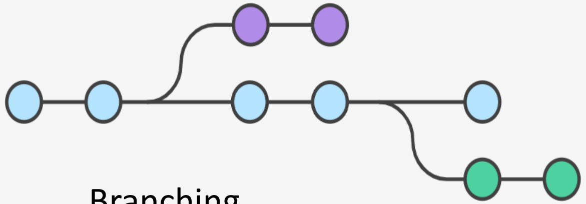
Technologies

A quick overview

Source code management (GIT)

- Function: provide version control
  - Enables teams to easily work on the same code base concurrently
- Git is **open source**, widely used, distributed architecture, off platform
  - Great capabilities for release building, integration with MF based SCM available

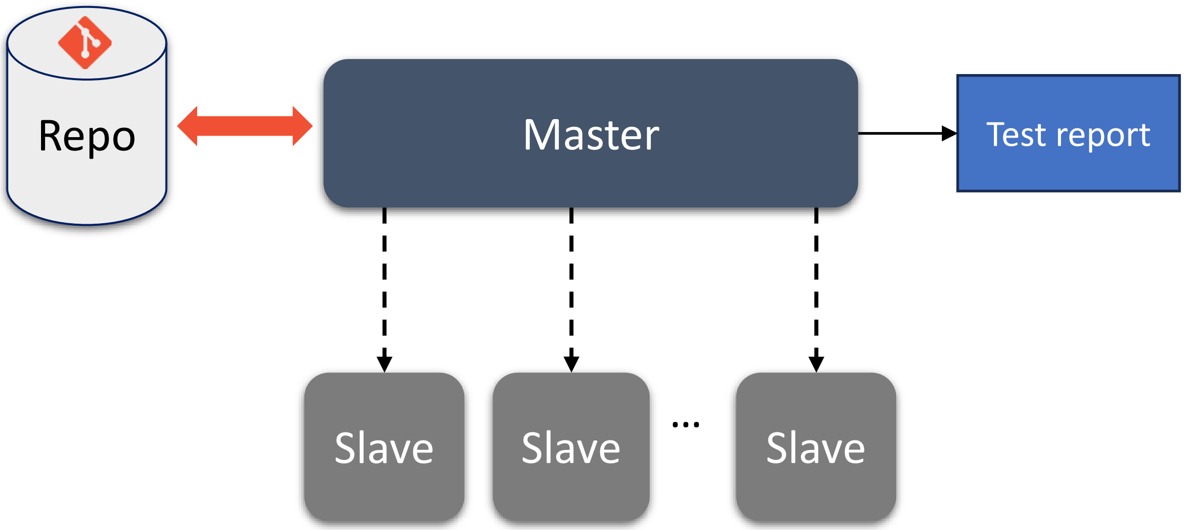




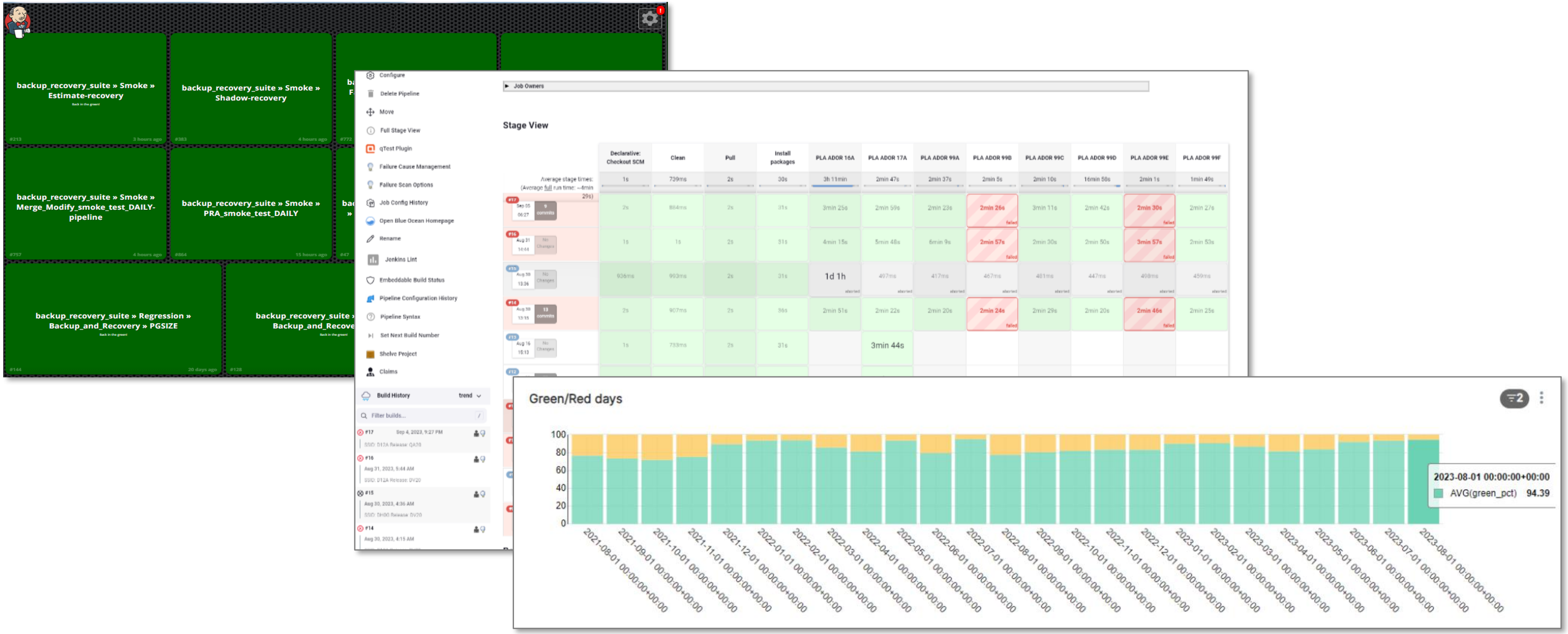
Branching

Process orchestration (Jenkins)

- Function: automated process execution
  - Jenkins is **open source**, widely used, distributed architecture, off platform
  - Repeatable actions can be easily executed
    - “the butler” getting tasks done according to your order
  - Known for pipelines consisting of one or more consecutive steps (stages)
    - Highly extendable. Large selection of extensions available
  - Strong integration with
    - Git(hub)
    - ServiceNow, Jira, Email, Slack etc., …



Sample reports



backup_recovery_suite » Smoke » Estimate-recovery
Back in the green!
#213 3 hours ago

backup_recovery_suite » Smoke » Shadow-recovery
#383 4 hours ago

#772

backup_recovery_suite » Smoke » Merge_Modify_smoke_test_DAILY-pipeline
#757 4 hours ago

backup_recovery_suite » Smoke » PRA_smoke_test_DAILY
#864 15 hours ago

#47

backup_recovery_suite » Regression » Backup_and_Recovery » PGSIZE
Back in the green!
#144 20 days ago

backup_recovery_suite » Backup_and_Recove
Back in the green!
#128

#17 Sep 4, 2023, 9:27 PM
SSID: D12A Release: QA20

#16
Aug 31, 2023, 5:44 AM
SSID: D12A Release: DV20

#15
Aug 30, 2023, 4:36 AM
SSID: DH0G Release: DV20

#14
Aug 30, 2023, 4:15 AM

Stage View

	Declarative: Checkout SCM	Clean	Pull	Install packages	PLA ADOR 16A	PLA ADOR 17A	PLA ADOR 99A	PLA ADOR 99B	PLA ADOR 99C	PLA ADOR 99D	PLA ADOR 99E	PLA ADOR 99F
Average stage times: (Average full run time: ~4min 29s)	1s	739ms	2s	30s	3h 11min	2min 47s	2min 37s	2min 5s	2min 10s	16min 58s	2min 1s	1min 49s
#17 Sep 05 06:27 9 commits	2s	884ms	2s	31s	3min 25s	2min 59s	2min 23s	2min 26s failed	3min 11s	2min 42s	2min 30s failed	2min 27s
#16 Aug 31 14:44 No Changes	1s	1s	2s	31s	4min 15s	5min 48s	6min 9s	2min 57s failed	2min 30s	2min 50s	3min 57s failed	2min 53s
#15 Aug 30 13:36 No Changes	936ms	993ms	2s	31s	1d 1h aborted	497ms aborted	417ms aborted	467ms aborted	481ms aborted	447ms aborted	498ms aborted	459ms aborted
#14 Aug 30 13:15 13 commits	2s	907ms	2s	36s	2min 51s	2min 22s	2min 20s	2min 24s failed	2min 29s	2min 20s	2min 46s failed	2min 25s
#13 Aug 16 15:13 No Changes	1s	733ms	2s	31s		3min 44s						
#12												

Green/Red days

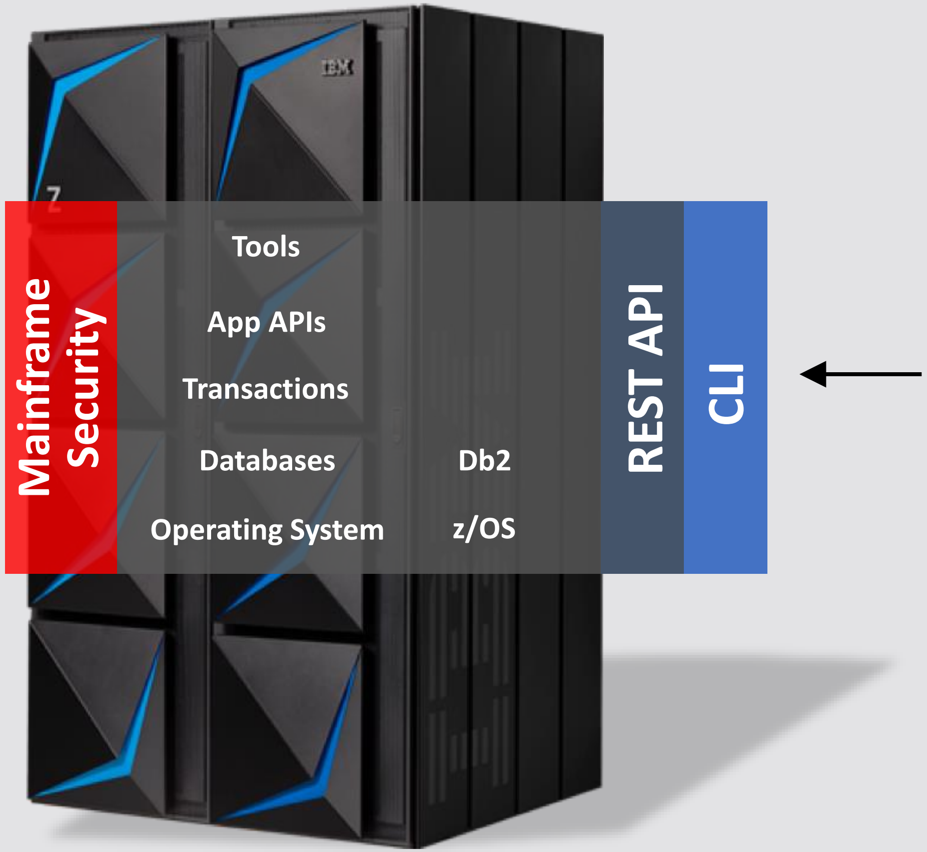
Process orchestration (z/OSMF)

- Function: automated process execution
    - z/OSMF is mainframe only
    - Current usage includes software installation and maintenance
- Jenkins like process control
- Can be integrated in distributed processes using Zowe cli
    - Integrating non-mainframe process … that is not what it is designed for

Ansible

- Please check out the session “Get Cozy with Ansible” by Denis Tronin
- While it is very valuable for infrastructure maintenance as well as program build etc., I personally feel that Ansible is more means to perform tasks then an alternative for orchestration
- To be complete ... excellent for:
  - “infrastructure as code”
  - More difficult for the integration that I am looking for
- **I’d like to be proven wrong**

Integrate … The magic word



Mainframe Security

Tools

App APIs

Transactions

Databases Db2

Operating System z/OS

REST API

CLI

OPEN MAINFRAME PROJECT

Zowe

NEXT GEN DEVELOPER

MODERN DEVOPS TOOLS

Jenkins

Jest

GitHub

Gradle

python

node

Se

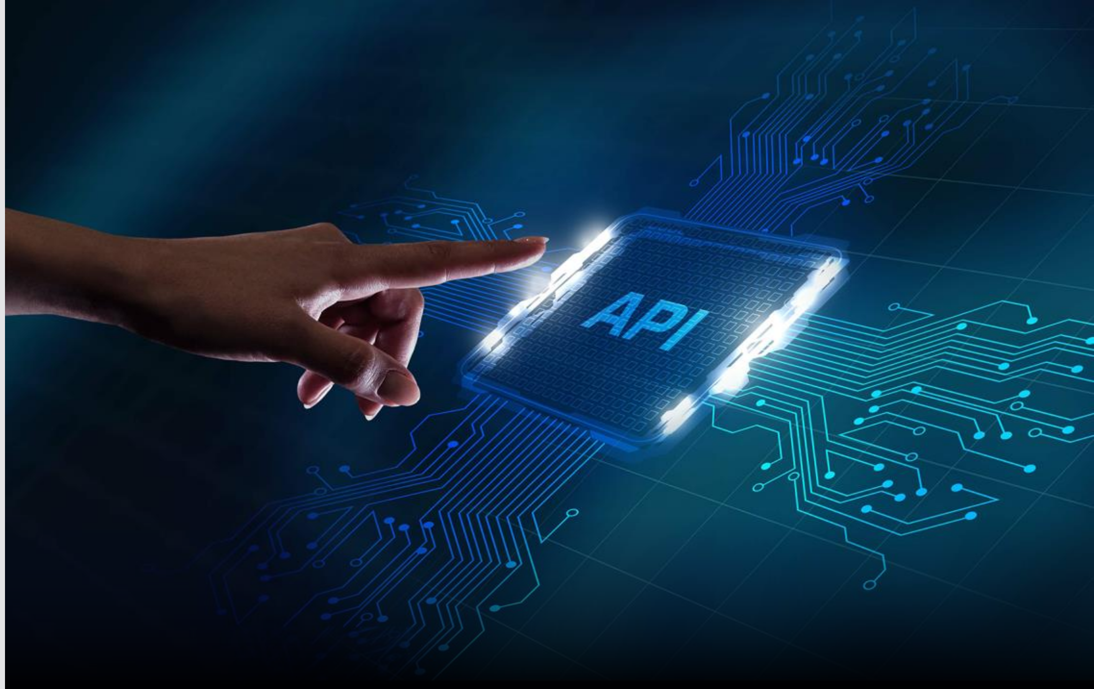
IntelliJ IDEA

APACHE JMeter™

Gulp

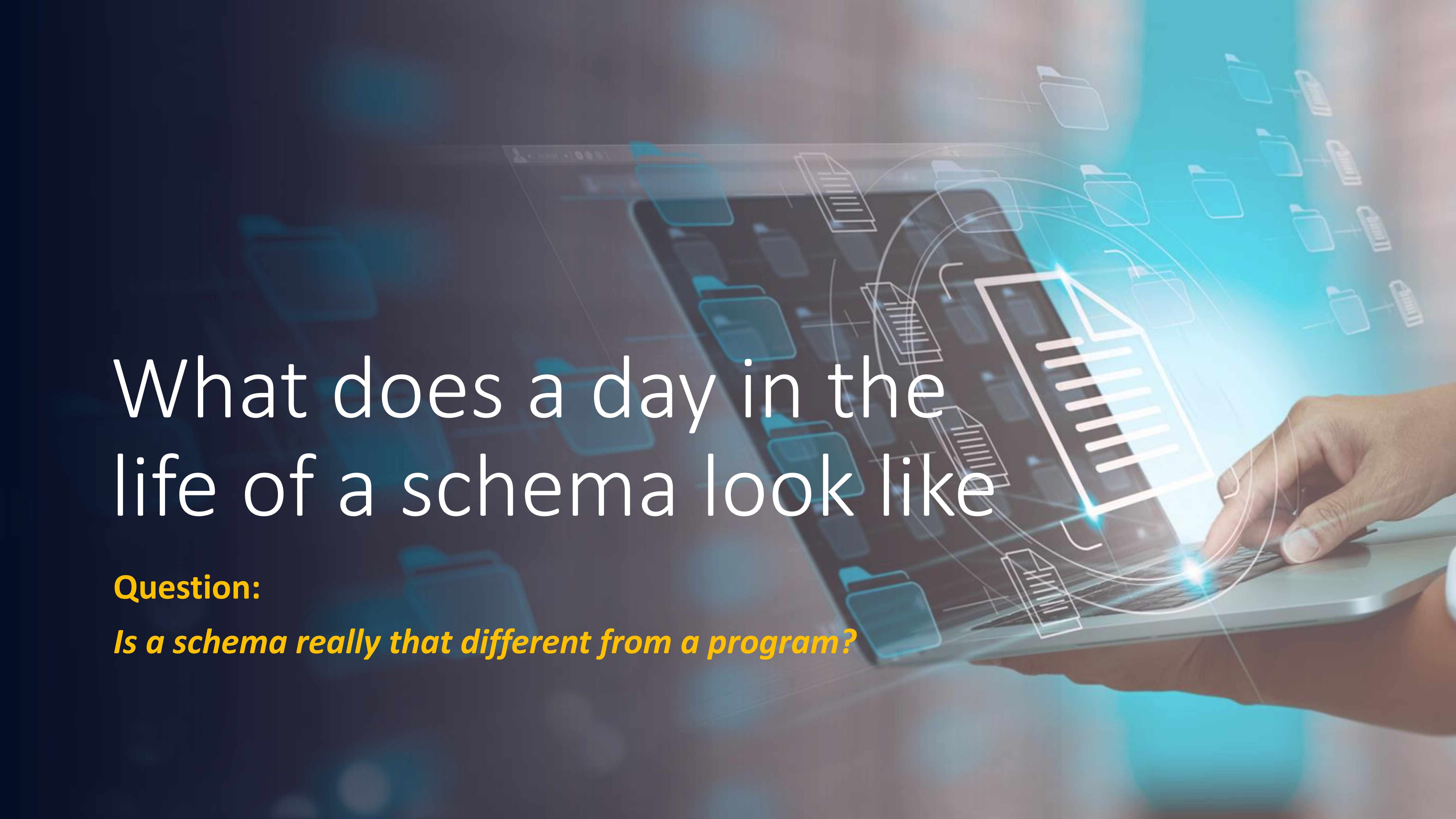
… One more thing … API

- I use the term liberally
- Ideally, there are REST API's available for direct consumption
  - Remember there is always Zowe …
  - More and more product services can be invoked directly



"An application programming interface (API) is a way for two or more computer programs to communicate with each other. It is a type of software interface, offering a service to other pieces of software."

-- Source: Wikipedia



What does a day in the life of a schema look like

Question:

Is a schema really that different from a program?

The day starts … Developer view

Time mol	Activity	Remarks
08.00	Coffee ☺	
08:15	Standup meeting to discuss today's activities	
08:45	Analyze time …	"I need a new column + index"
10:00	Daily consultancy meeting with Dba	Here's how you do it
11:00	Self-provision schema and data	(semi) Automated Action 1
11:01	Pre-change test (functional)	(semi) Automated Action 2
11:10	Implement schema changes as discussed + deploy	(semi) Automated Action 3
11:11	Code the change and new test data	
13:00	Post-change test (functional)	(semi) Automated action 4
15:00	Commit today's work	Manual action by developer

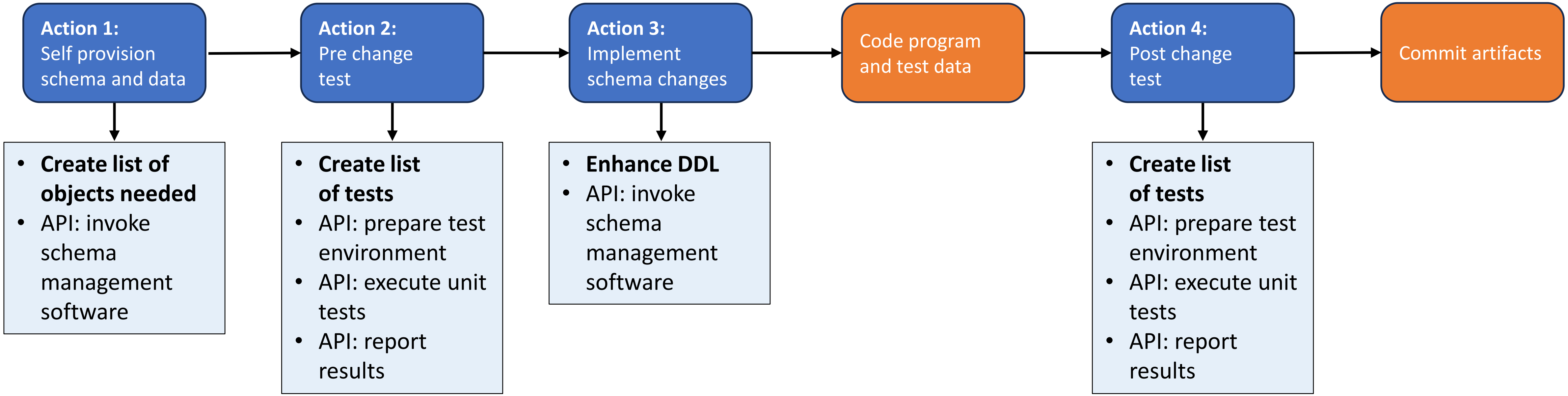
The day starts … Dba view

Time mol	Activity	Remarks
08.00	Coffee ☺	
08:15	Standup meeting to hear about today’s activities	
08:45	More coffee (with donuts) ☺	
10:00	Daily consultancy meeting with Dba	Discuss results of yesterday’s analysis
11:00	Analyze previous days reports from system testing	(with more coffee)
	Design and create solutions. Optimize, build more and better automation	
14:00	Commit purely Schema level improvements	→ For tomorrow’s meeting
15:00	Handle any requests coming out of schema change integration	
16:00	Prepare for tomorrow’s consulting meeting with developers	

The day starts … System view

Time mol	Activity	Remarks
15:00	No coffee needed ☺	
15:10	Testing time	Kick of integration tests
15:15	Identify test cases based on committed programs	Automated Action 5
15:20	Prepare integration test environment and execute	Automated Action 6
16:00	Integrate **OK´d** changes into performance test environment	Automated Action 7
16:10	Drive the performance test	Automated Action 8
17:00	Integrate committed and positively tested changes	Automated Action 9
17:00	Prepare result dashboards and distribute reports	

A little more detail: Developer view



Action 1:
Self provision schema and data

- **Create list of objects needed**
- API: invoke schema management software

Action 2:
Pre change test

- **Create list of tests**
- API: prepare test environment
- API: execute unit tests
- API: report results

Action 3:
Implement schema changes

- **Enhance DDL**
- API: invoke schema management software

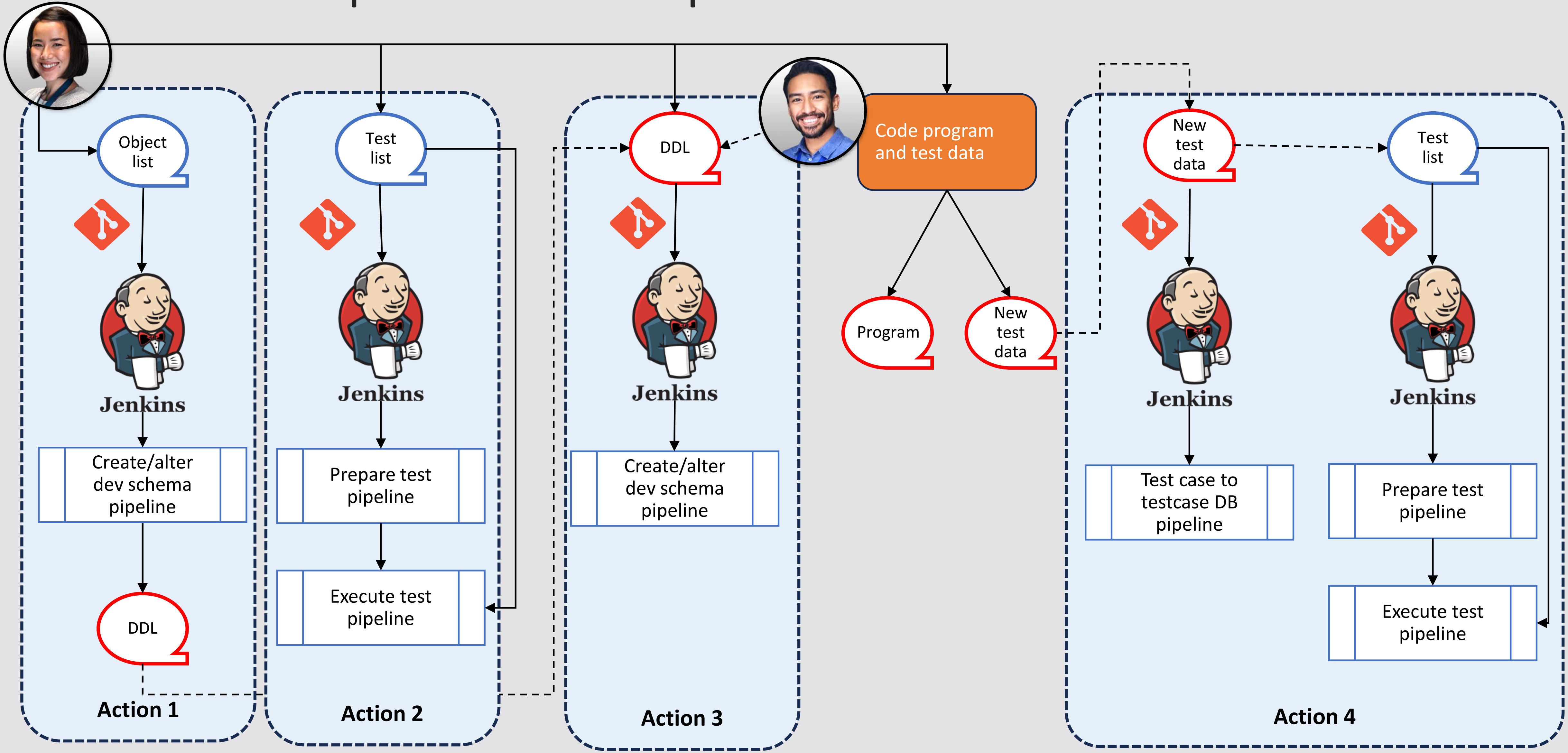
Code program and test data

Action 4:
Post change test

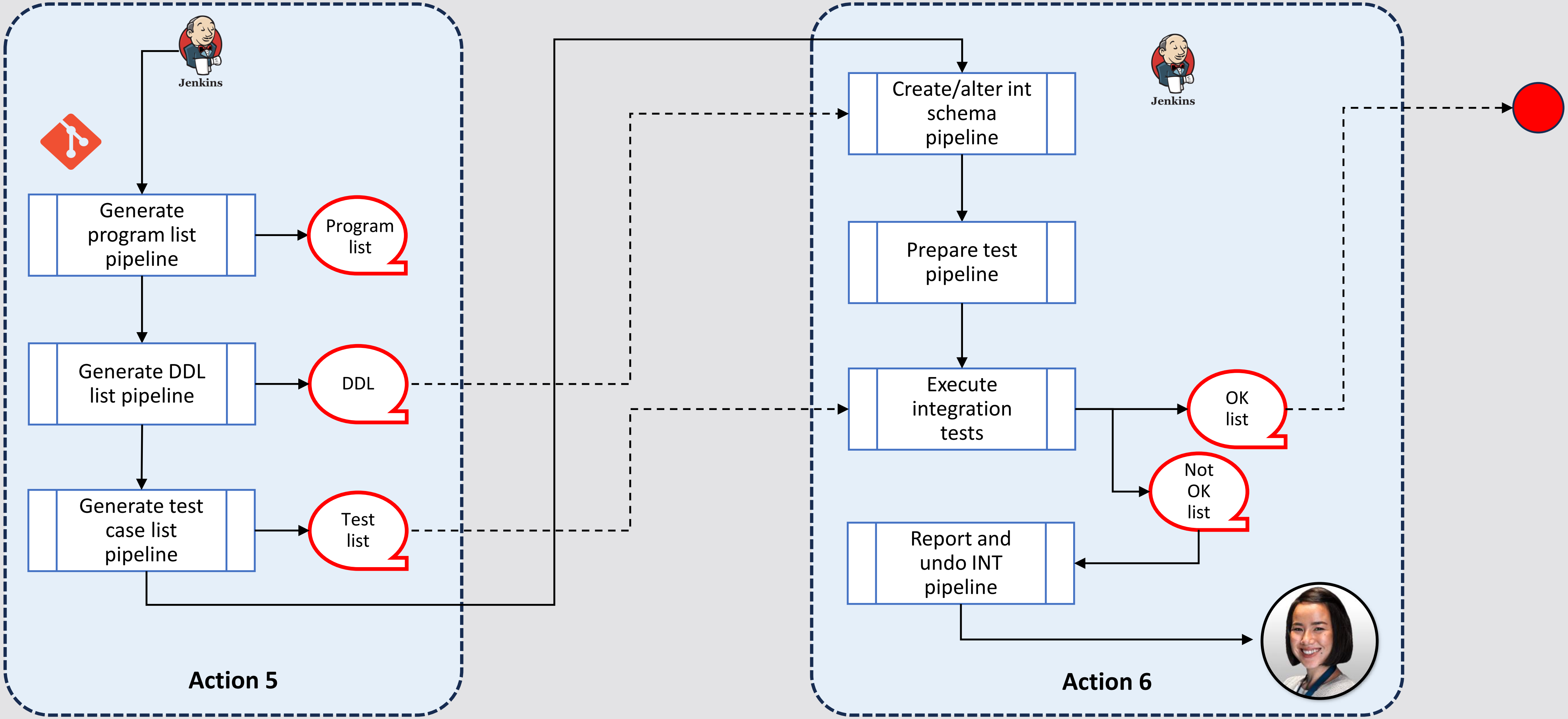
- **Create list of tests**
- API: prepare test environment
- API: execute unit tests
- API: report results

Commit artifacts

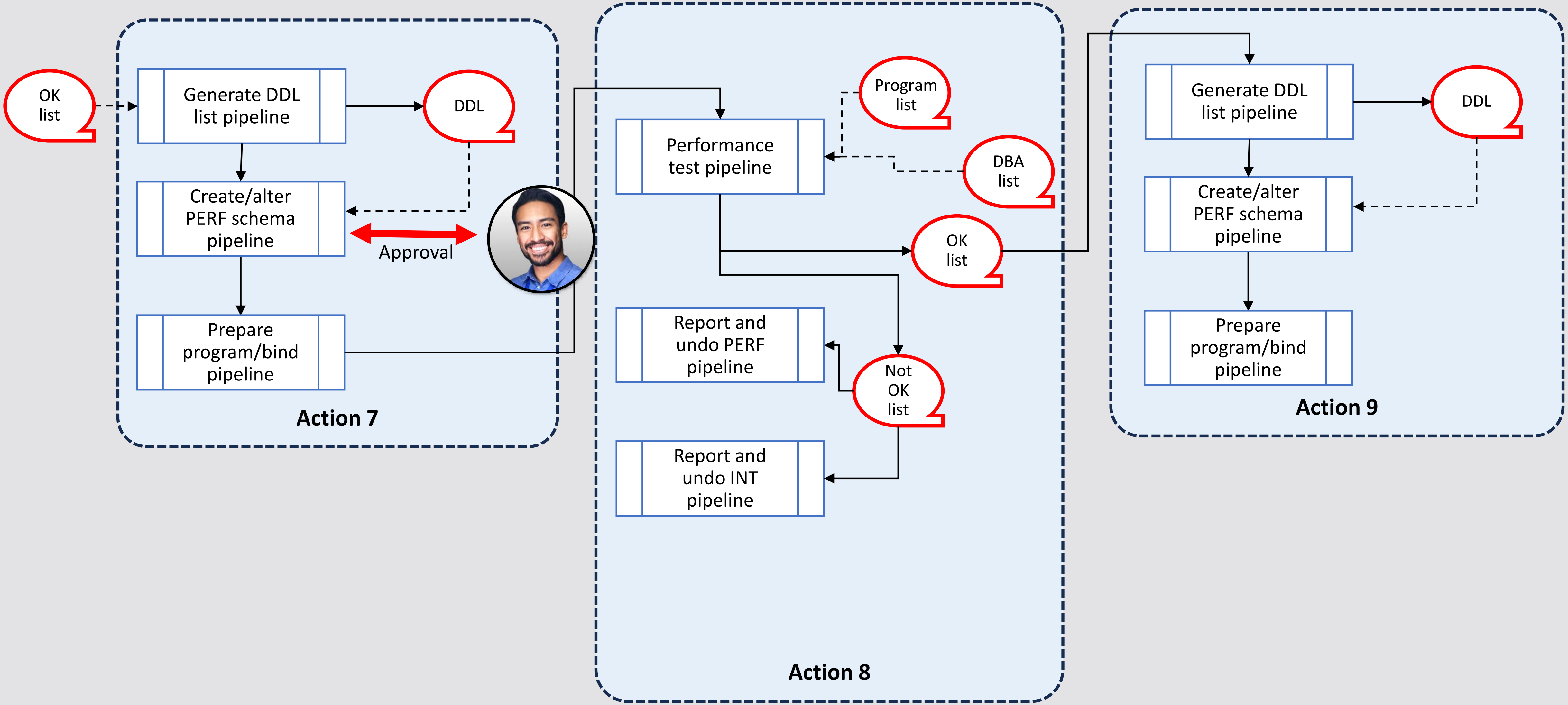
An example: Developer view



An example: System view (1/2)


Jenkins
Generate program list pipeline
Program list
Generate DDL list pipeline
DDL
Generate test case list pipeline
Test list
Action 5
Jenkins
Create/alter int schema pipeline
Prepare test pipeline
Execute integration tests
OK list
Not OK list
Report and undo INT pipeline
Action 6

An example: System view (2/2)


OK list
Generate DDL list pipeline
DDL
Create/alter PERF schema pipeline
Approval
Prepare program/bind pipeline
Action 7
Performance test pipeline
Program list
DBA list
OK list
Report and undo PERF pipeline
Not OK list
Report and undo INT pipeline
Action 8
Generate DDL list pipeline
DDL
Create/alter PERF schema pipeline
Prepare program/bind pipeline
Action 9

Questions….

Thank you

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