

Software Engineering Practices

PG – Monsoon 2025

Software Engineering Research Center

IIIT Hyderabad, India



- Software Offerings
- Software Industry
- Software Engineering Teams
- Software Development Life Cycle
- Software Product Methods
- Continuous Development and Continuous Integration
- DevOps and MLOps
- Software Productivity
- Technical Debt
- Software Development Waste

SaaS

PaaS

IaaS



Hosted Application /
Apps



Development tools,
database
management, business
analytics



Operating Systems



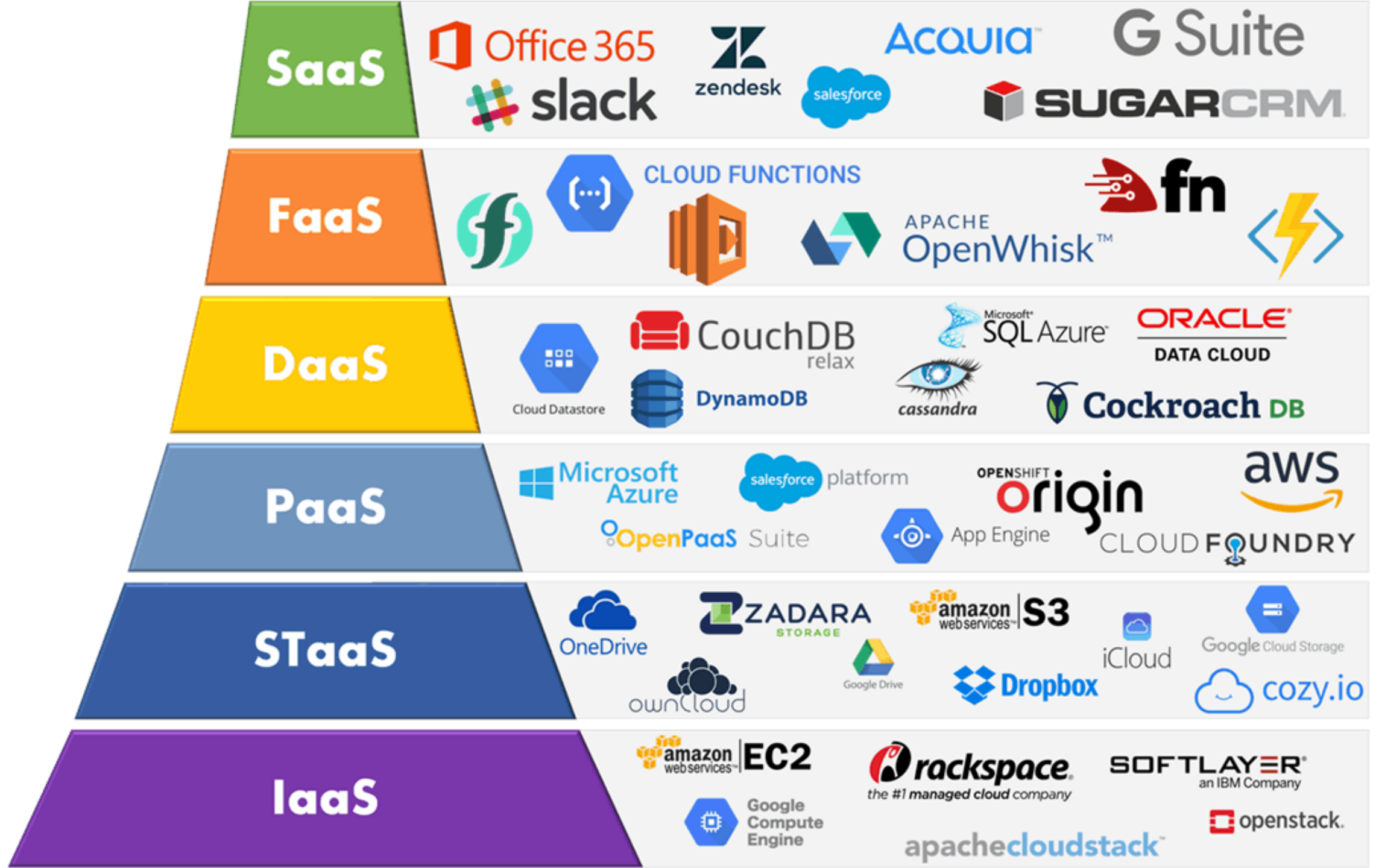
Servers and storage



Networking
firewalls/security



Data center physical
plant/building





Rights granted	Public domain	Permissive FOSS license (e.g. BSD license)	Copyleft FOSS license (e.g. GPL)	Freeware	Proprietary license
Copyright retained	No	Yes	Yes	Yes	Yes
Right to perform	Yes	Yes	Yes	Yes	Yes
Right to display	Yes	Yes	Yes	Yes	Yes
Right to copy	Yes	Yes	Yes	Often	No
Right to modify	Yes	Yes	Yes	No	No
Right to distribute	Yes	Yes, under same license	Yes, under same license	Often	No
Right to sublicense	Yes	Yes	No	No	No
Example software	SQLite, ImageJ	Apache web server, ToyBox	Linux kernel, GIMP, OBS	Irfanview, Winamp, Legends	Windows, xSplit, TIDAL DRMs, Spotify,

**Copyright****Copyleft****Permissive****Creative Commons****What is a user allowed to do with the code?**

What creator dictates

What user wants under certain rules

What user wants with a few restrictions

What user wants without restrictions

Clause of the use

As creator dictates

Derivative work must be attributed to creator, open-source and copyleft

Derivative work must be attributed to a creator

Derivative work must be attributed to a creator

Source code

As creator dictates

Must be open

Don't have to be open

No specific terms about the distribution of source code

Is creator liable for bugs?

✓ YES

✓ YES

✗ NO

✗ NO

Re-licensing

As creator dictates

Derivative work cannot be released as proprietary software

Derivative work can be released under another license or as proprietary software

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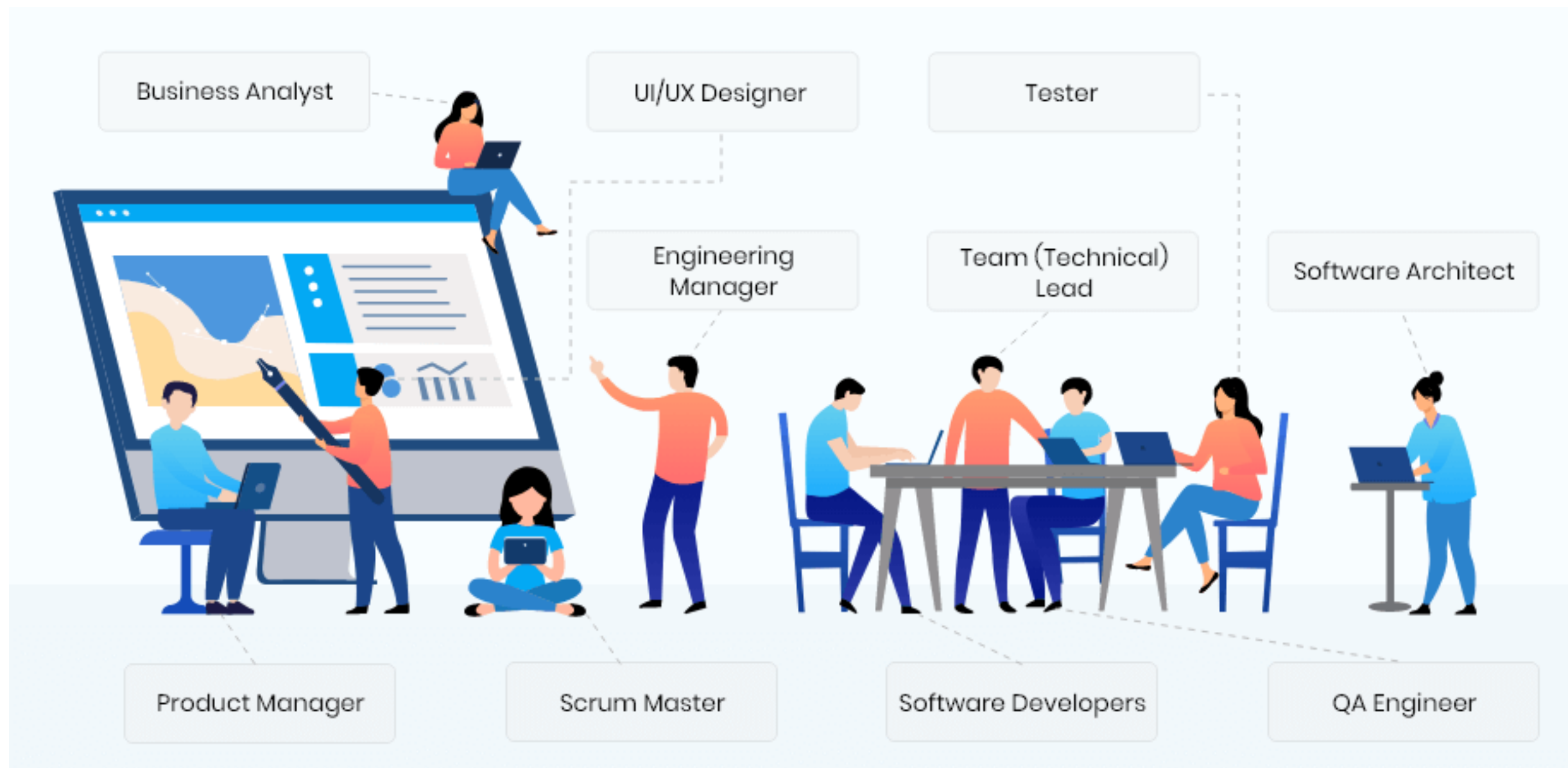
Commercial restrictions

As creator dictates

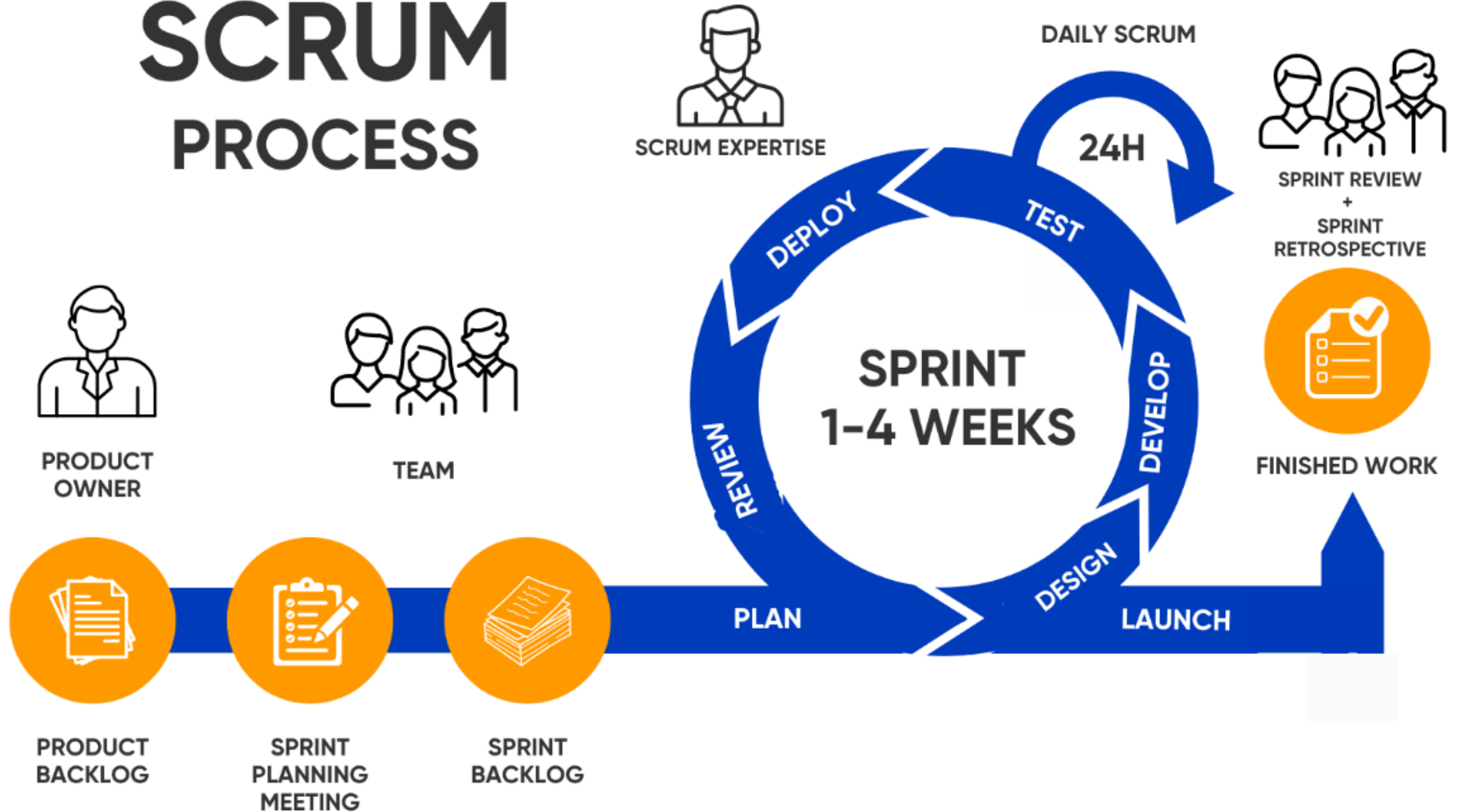
Permitted

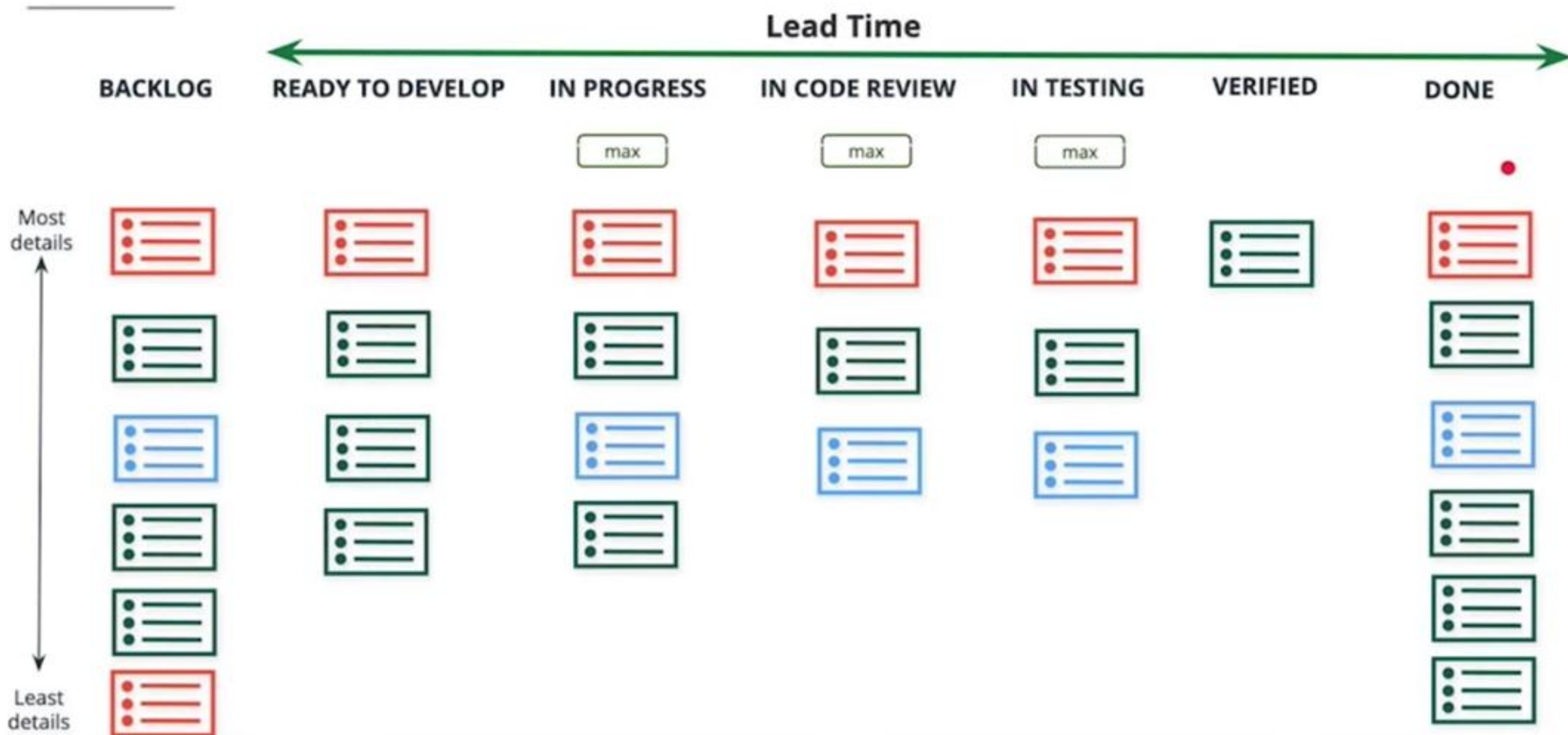
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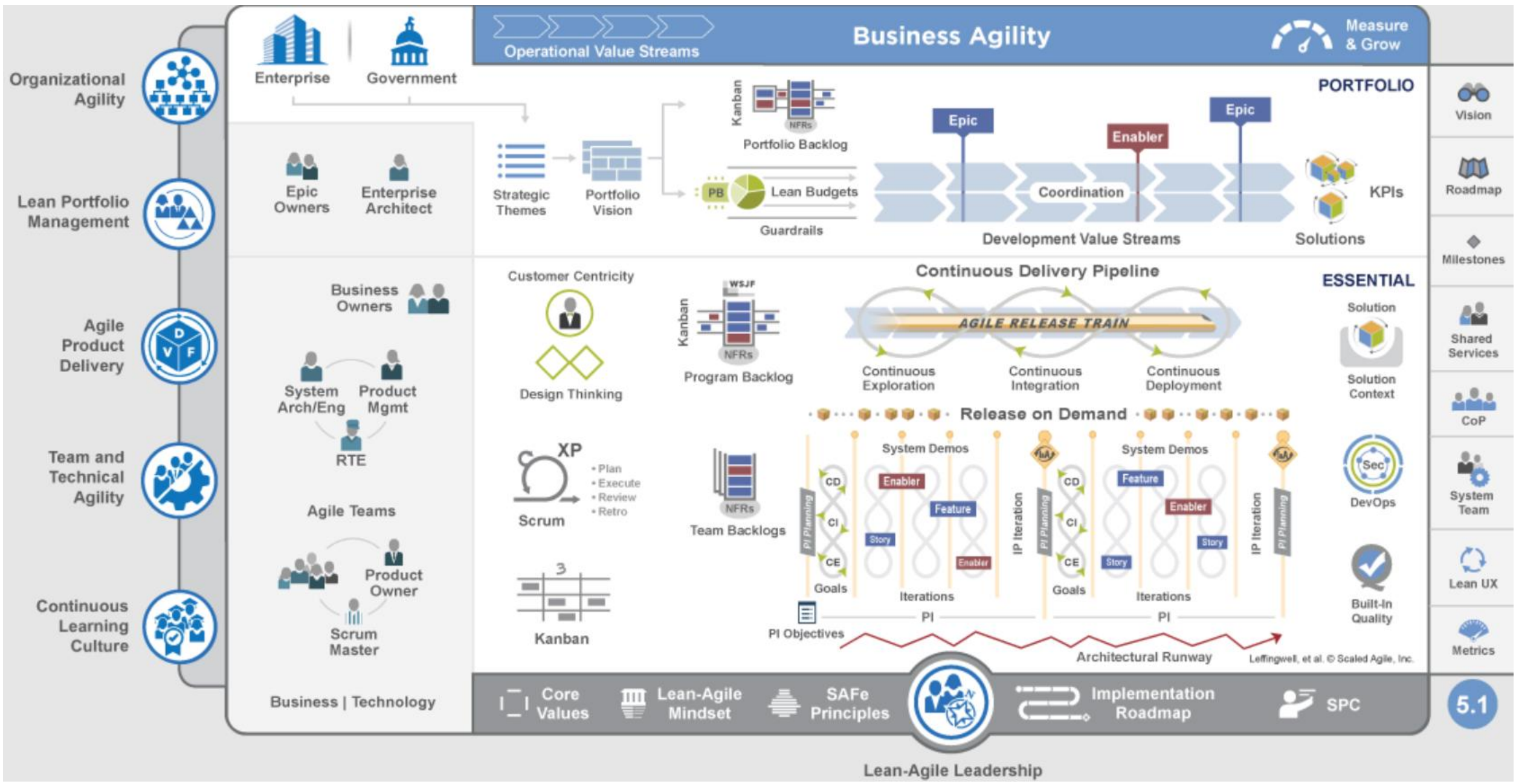
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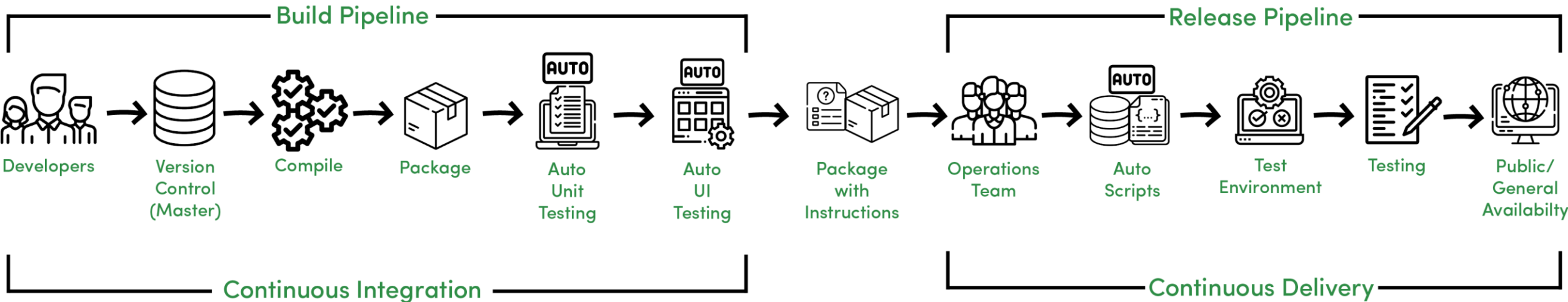


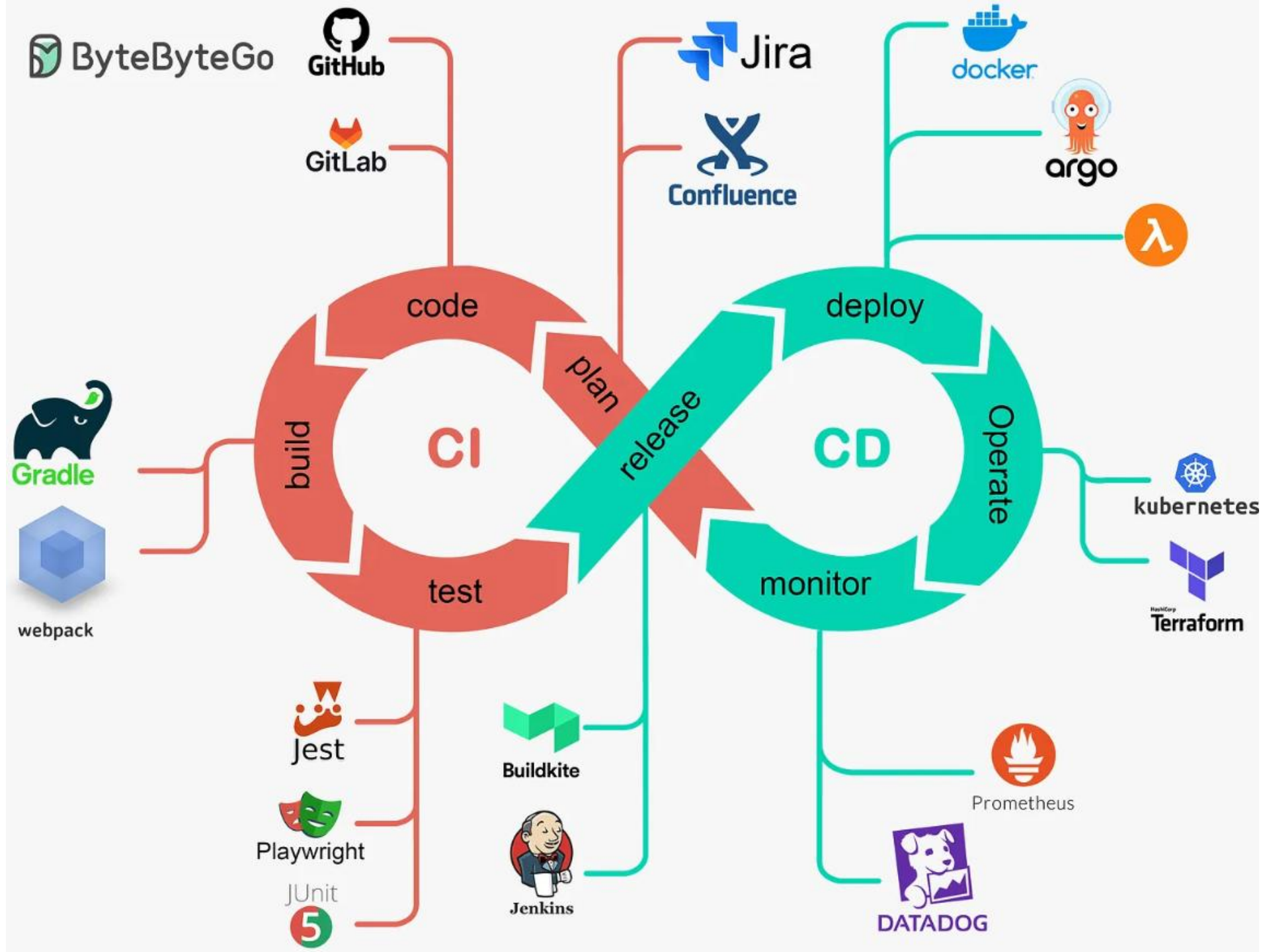
SCRUM PROCESS

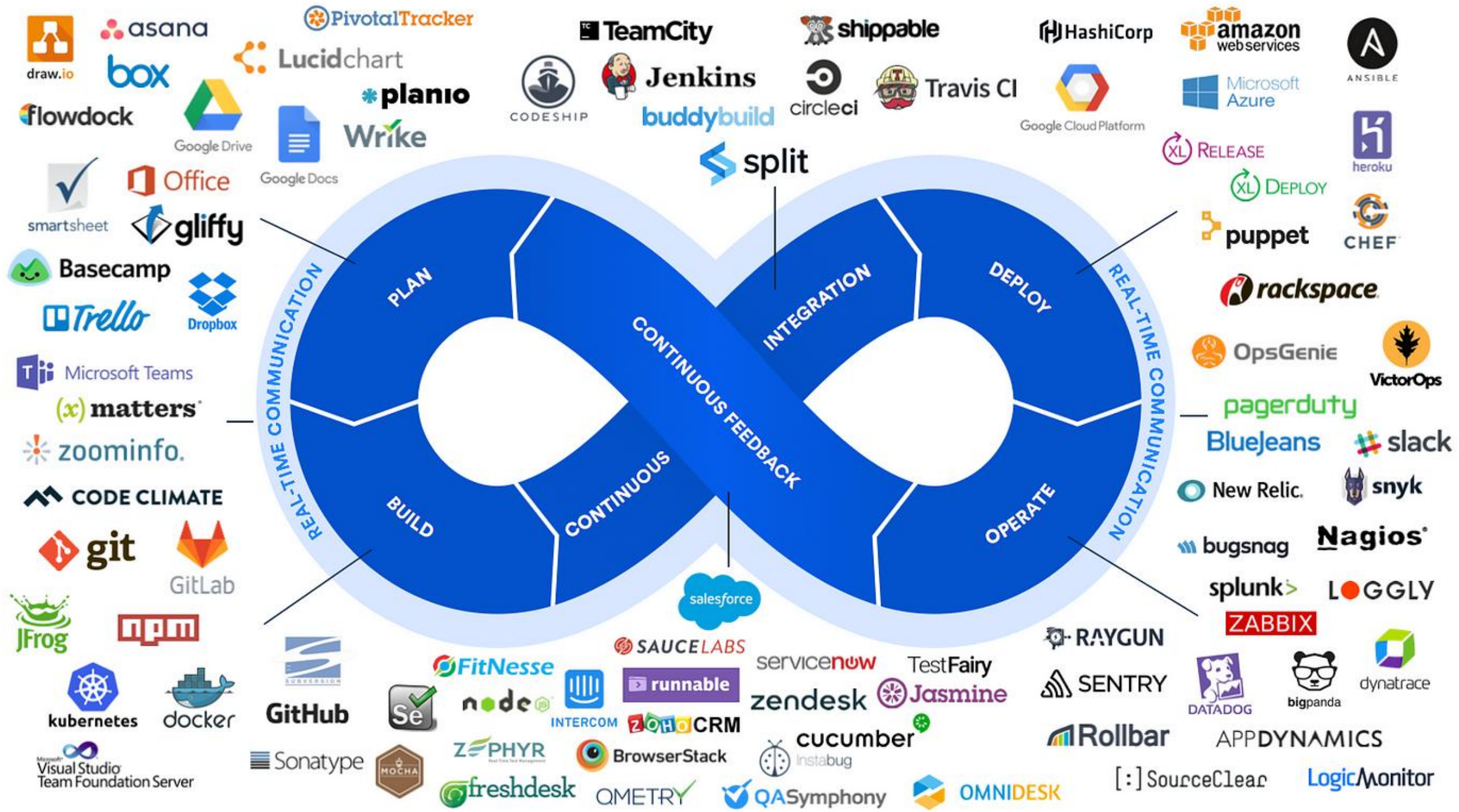












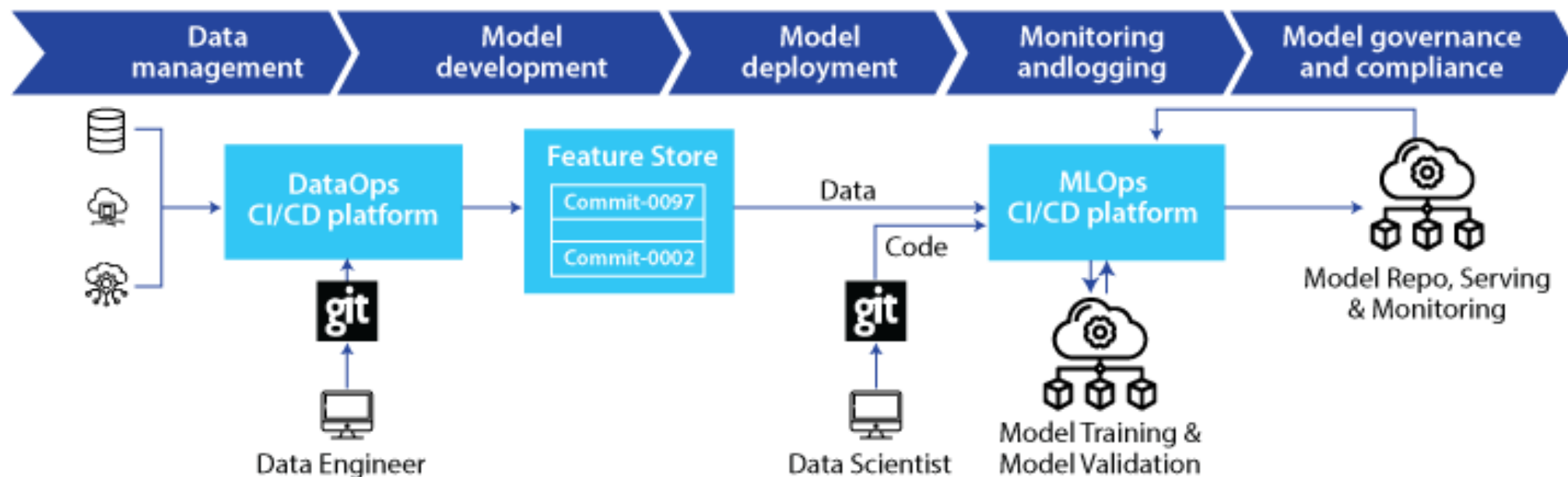
MLOps= ML + DEV + OPS



Experiment
Data Acquisition
Business Understanding
Initial Modeling

Develop
Modeling+Testing
Continuous integration
Continuous Deployment

Operate
Continuous Delivery
Data Feedback Loop
System + Model Monitoring



DORA

4 key metrics

Published in 2018



Lead Time
for Changes



Change
Failure Rate



Deployment
Frequency



Mean Time
to Recovery
(MTTR)

SPACE

5 dimensions

Published in 2021



Satisfaction
and Well-being



Performance



Activity



Communication
and
Collaboration



Efficiency
and Flow

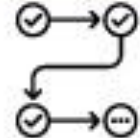
FLOW METRICS

5 key metrics

Published in 2018



Flow
Velocity



Flow
Efficiency



Flow
Time

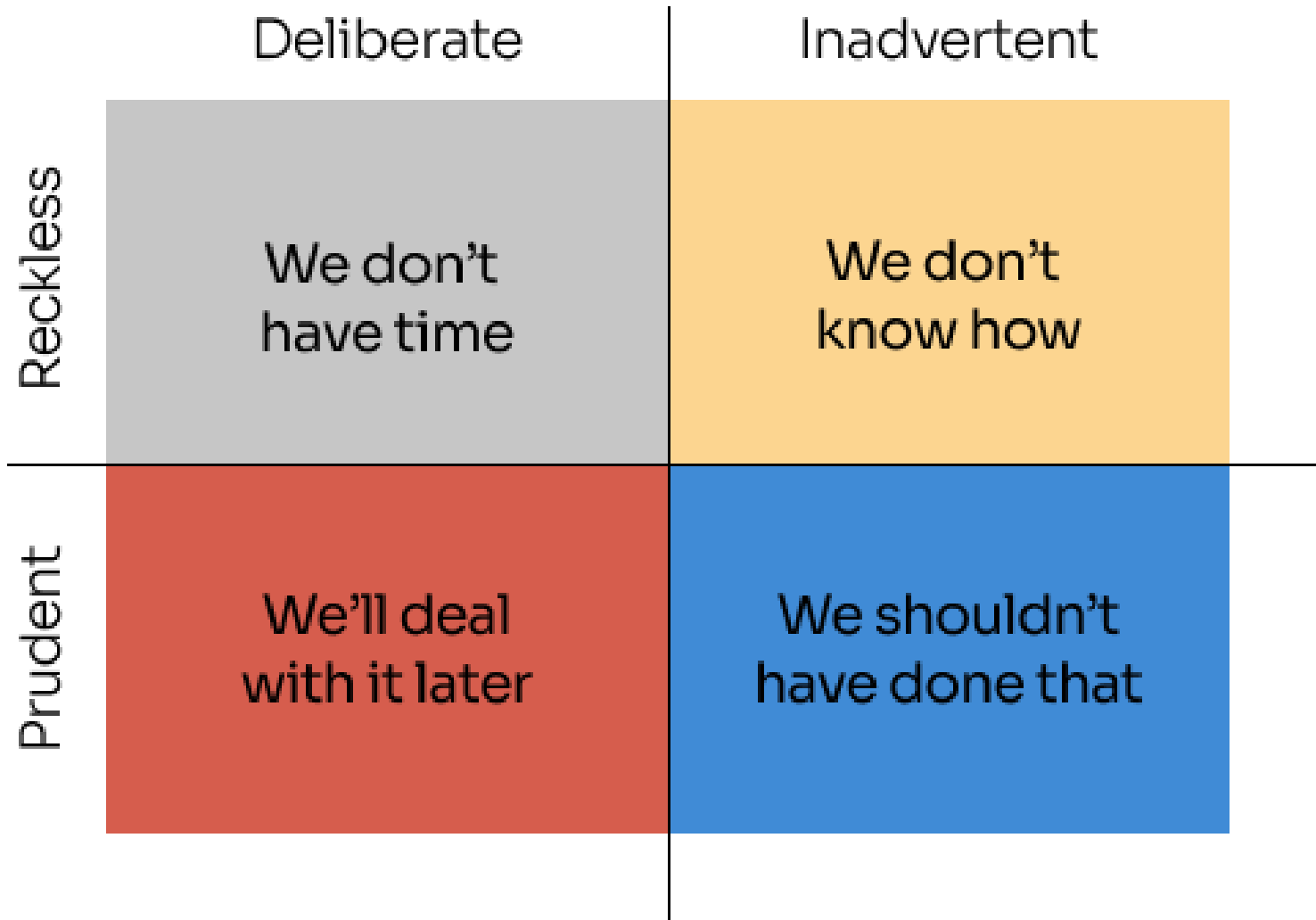


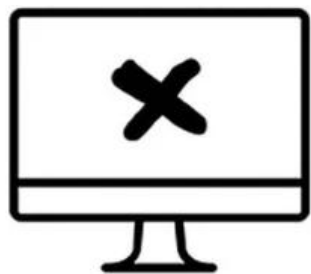
Flow
Load



Flow
Distribution

Technical debt quadrants





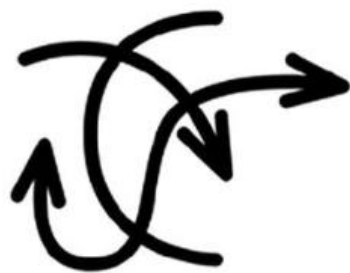
Building the wrong
feature or product



Mismanaging the
backlog



Rework



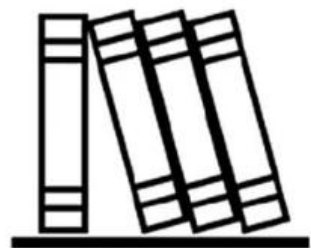
Unnecessarily complex
solutions



Extraneous cognitive
load



Psychological distress



Knowledge loss



Waiting/multitasking



Ineffective communication