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Agenda:

Waterfall

Agile

SRE

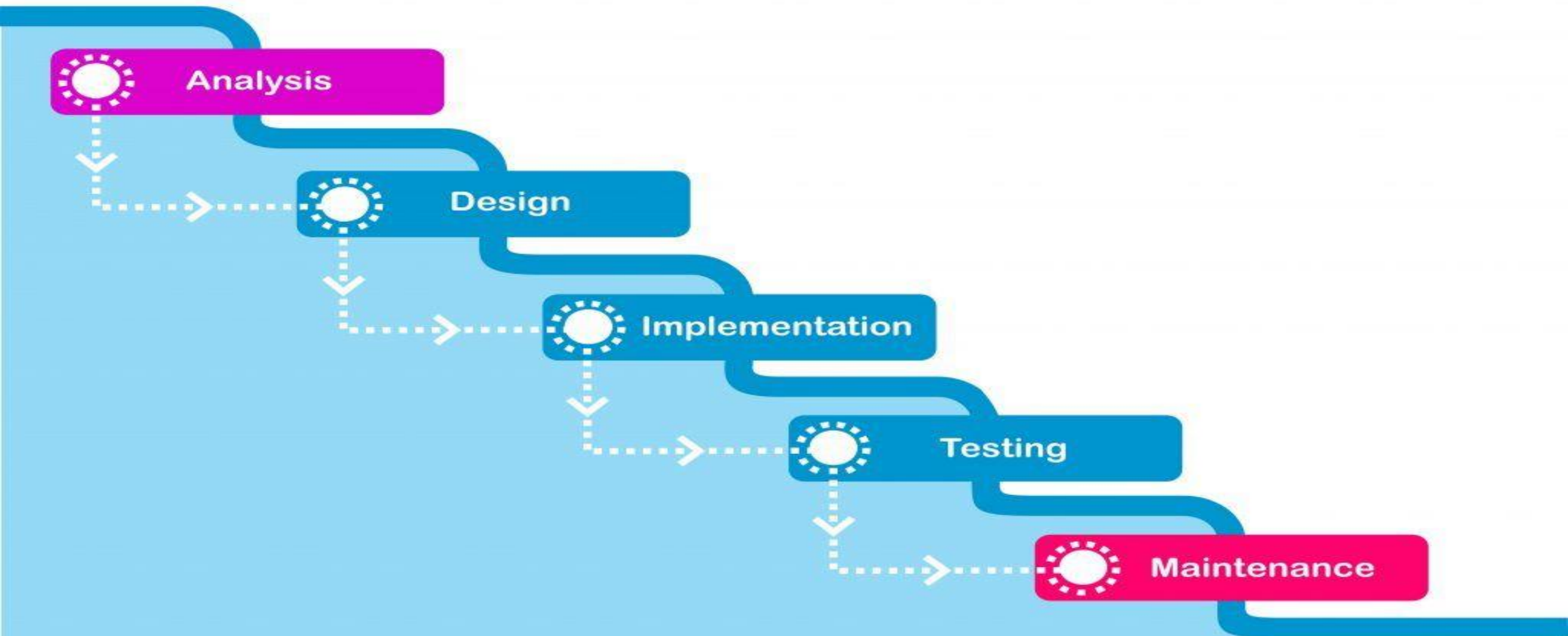
DevOps

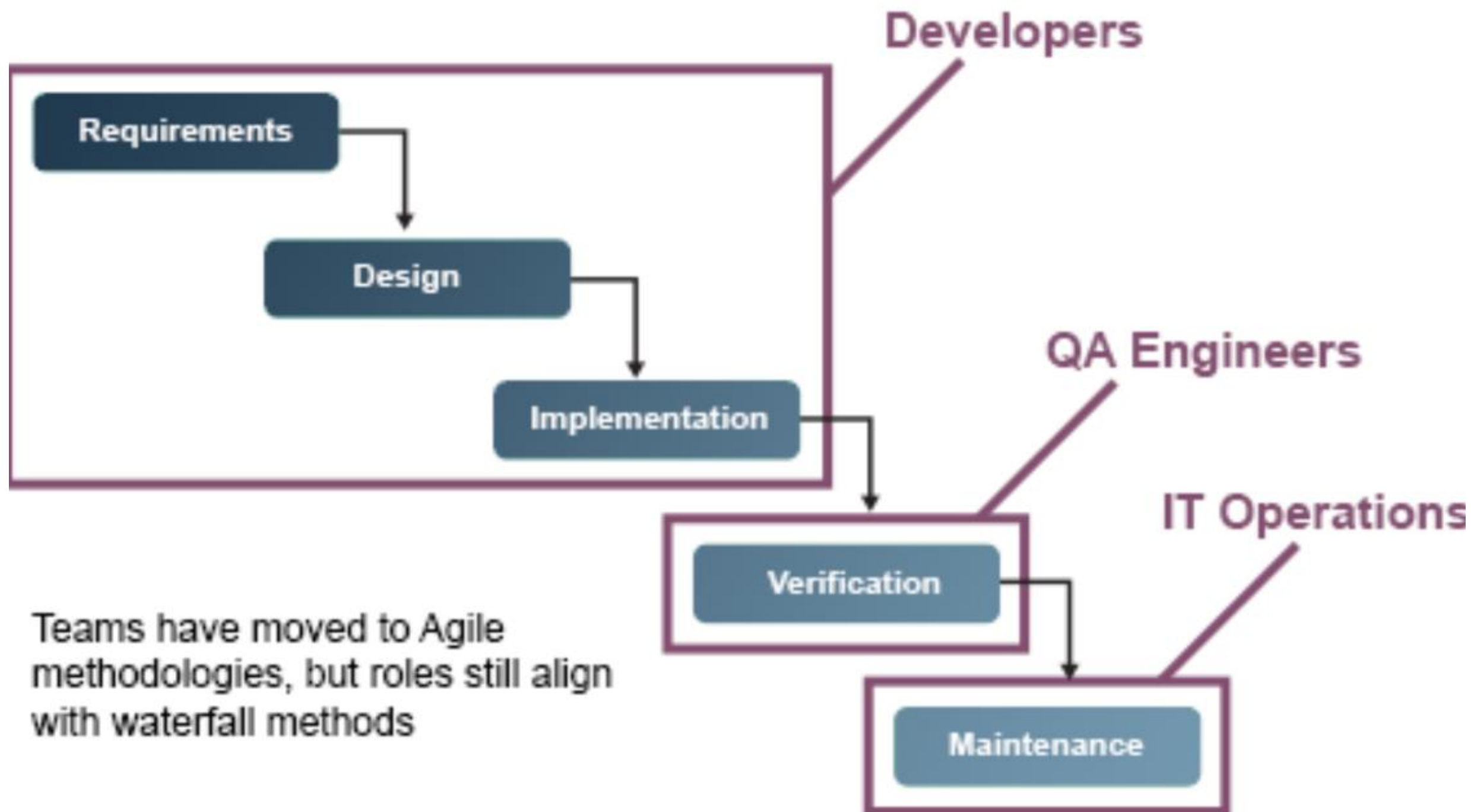
DevSecOps

Evolution of AI and AIOps and MLOps

DevOps + AiOps

WATERFALL







+



+

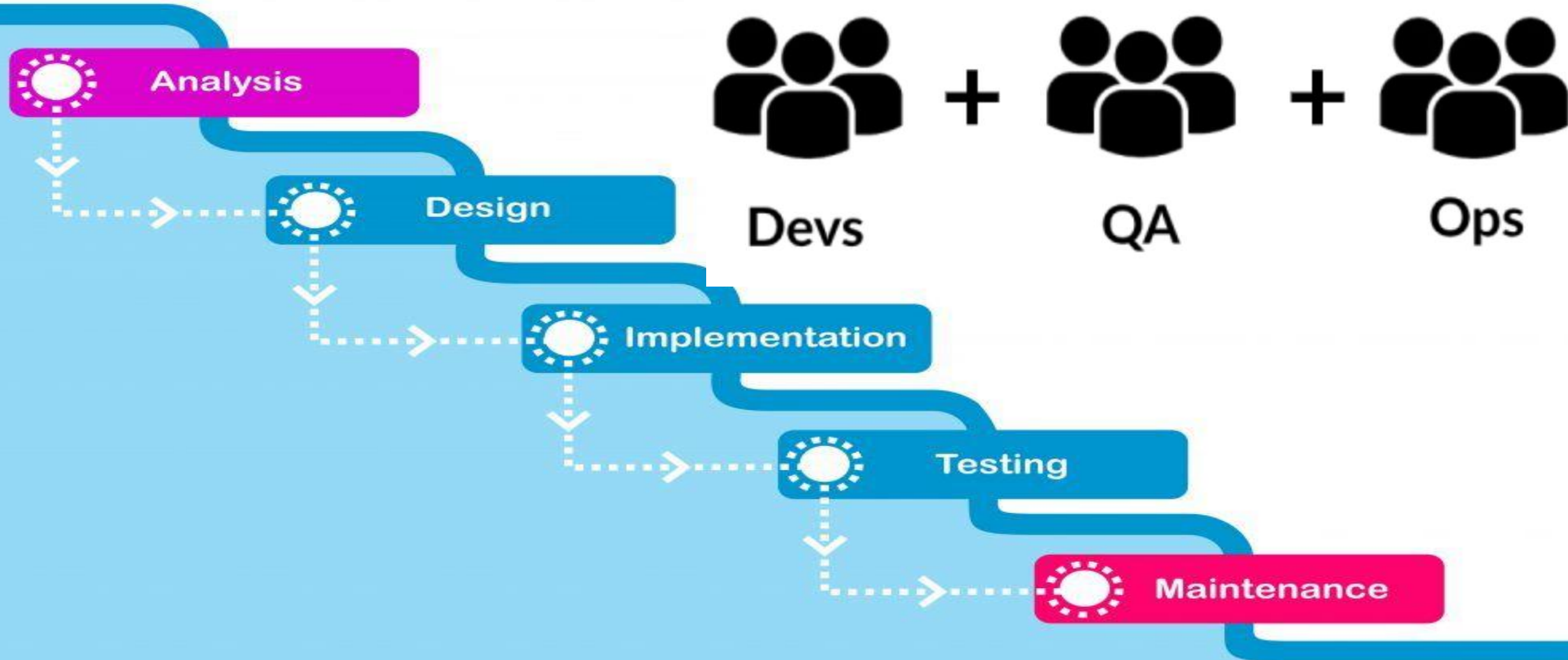


Devs

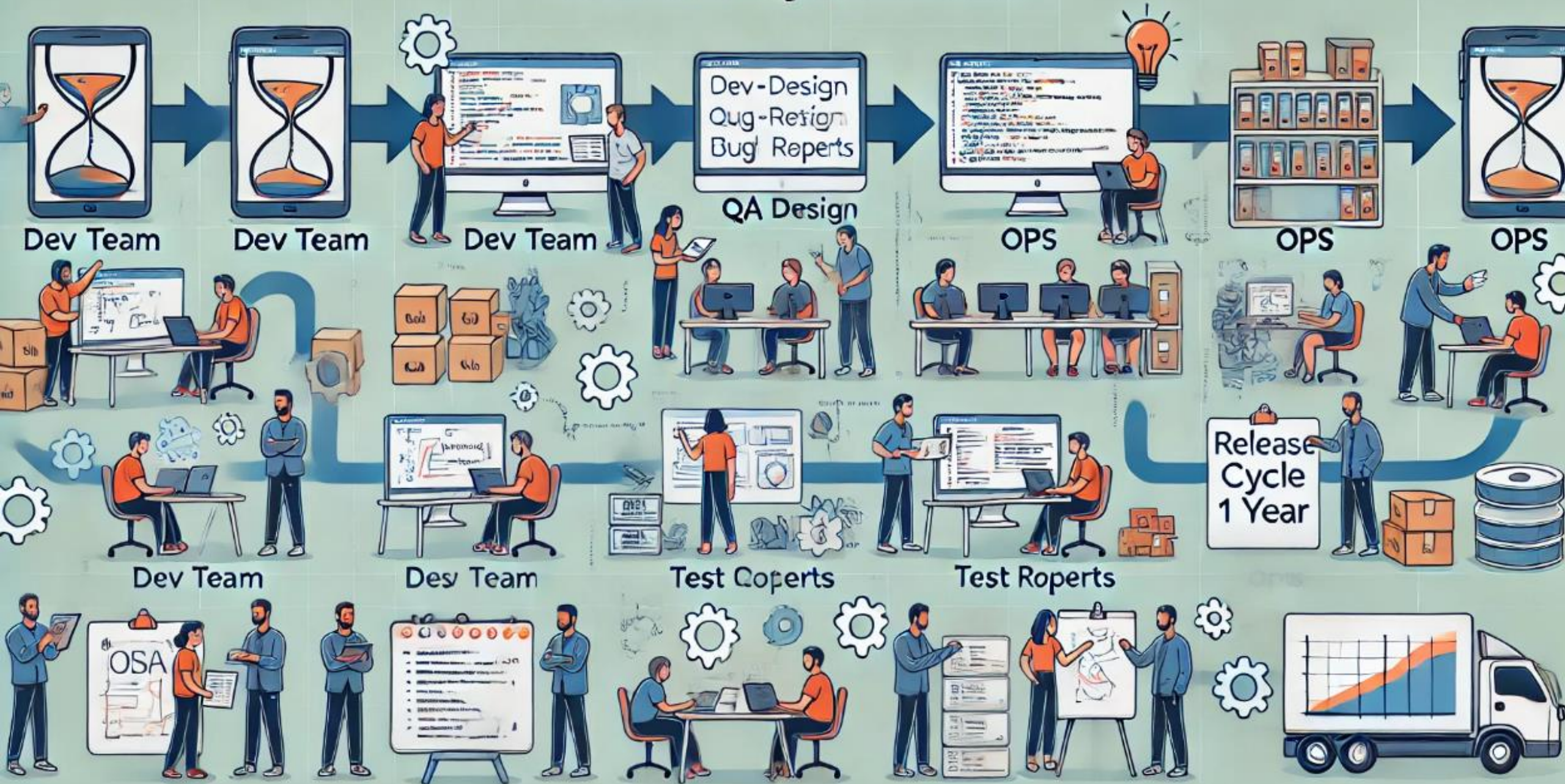
QA

Ops

WATERFALL



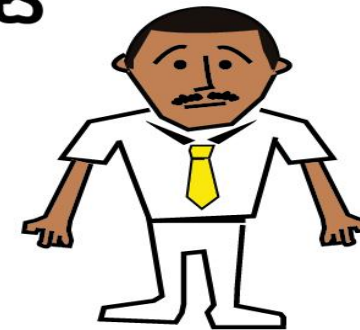
Release Cycle 1 Year



1

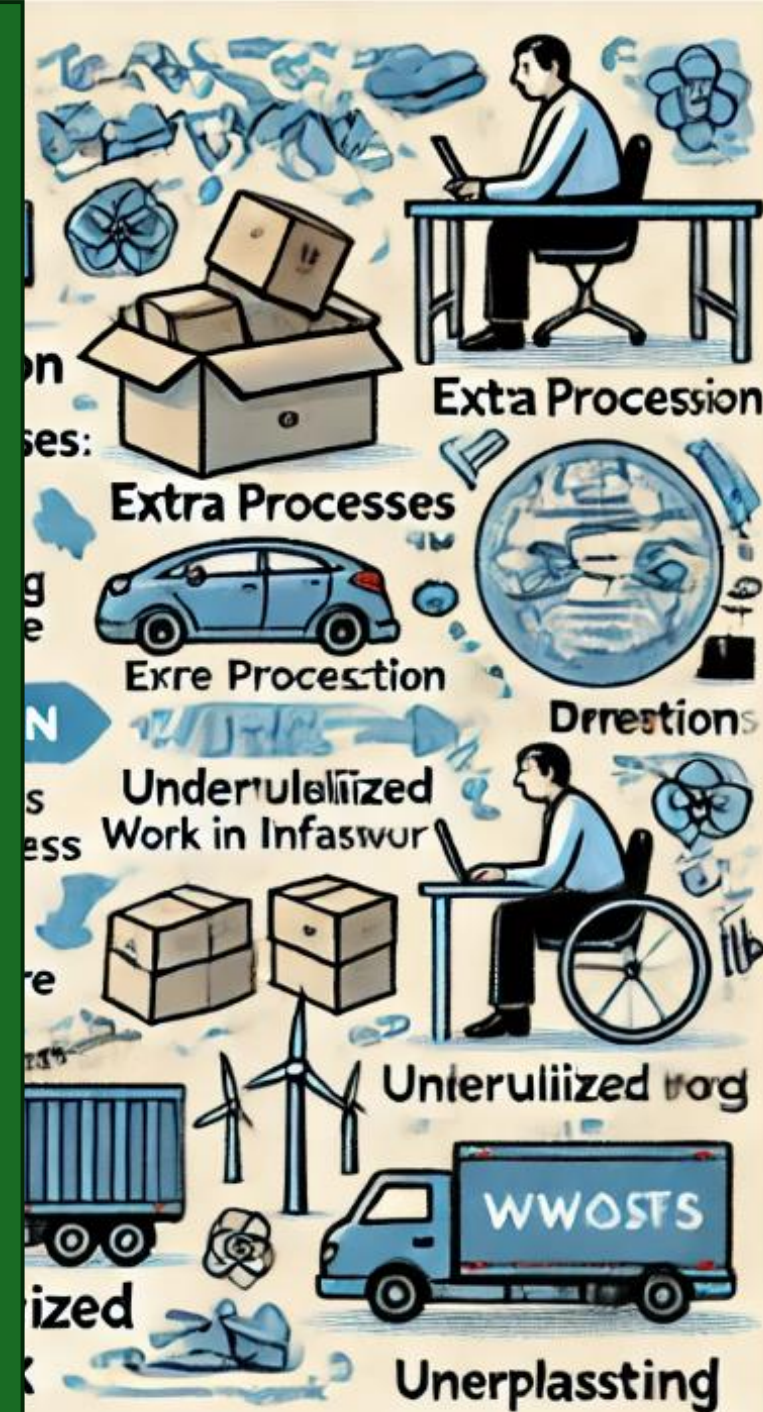
Inability To Deliver

**Finishing Late
Exceeding Budget
Quality issues**



Waste

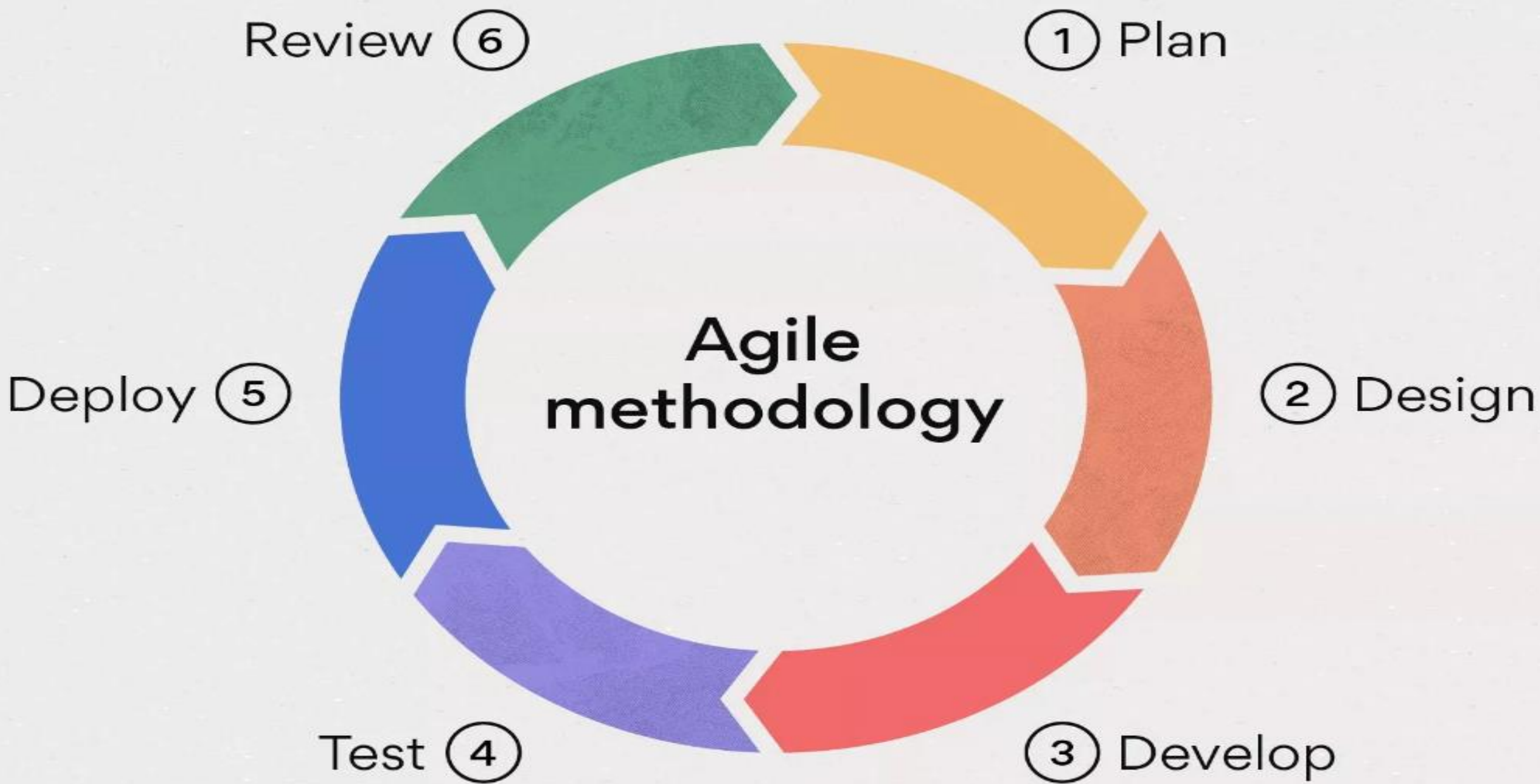
1. Waiting
2. Overproduction
3. Extra Processes
4. Transportation
5. Inventory
6. Motion
7. Defects
8. Overprocessing
9. Underutilized Talent
10. Unplanned Work
11. Insufficient Automation
12. Miscommunication



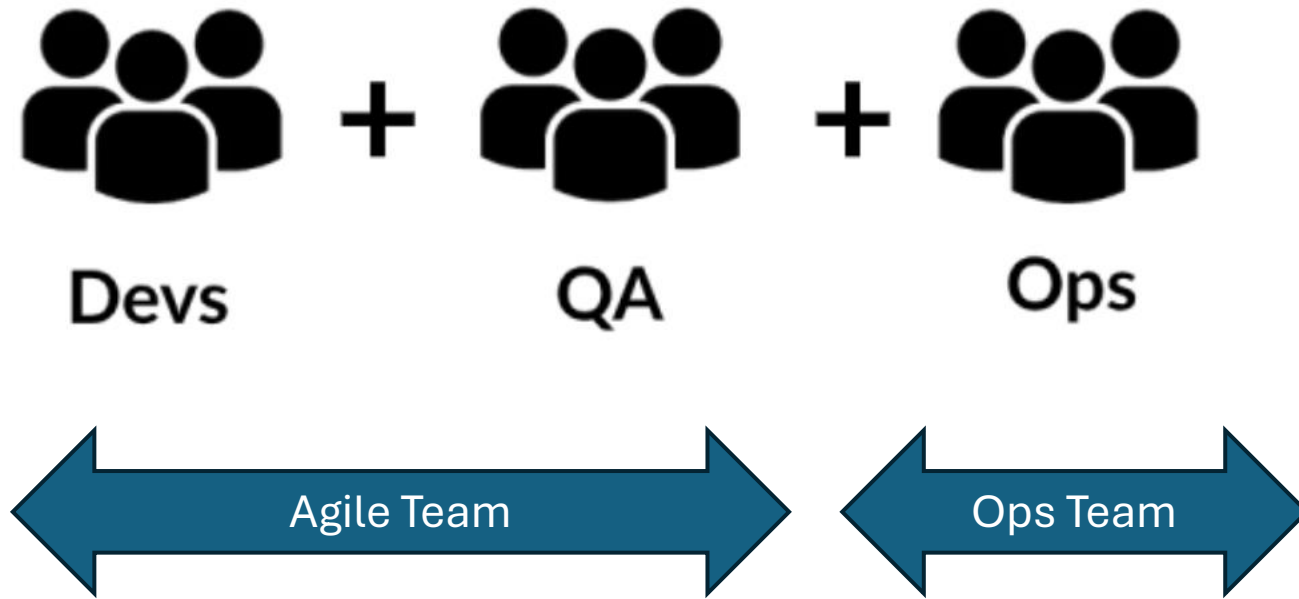
Pain

- Context Switching
- Technical Debt
- Cultural Resistance
- Siloed Teams
- Lack of Visibility
- Tool Sprawl
- Inconsistent Environments
- Resource Constraints
- Poor Change Management
- Security Vulnerabilities





Development / Agile Team

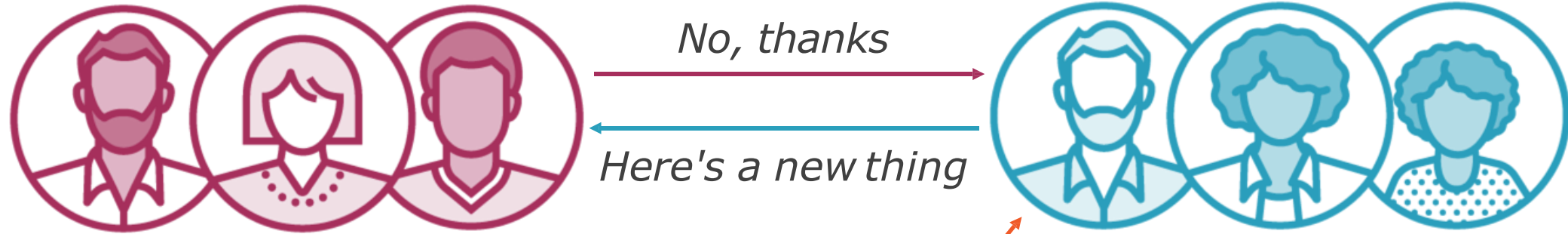


2 Weeks
Release Cycle



Ops Team

Development / Agile Team



Give me reliability

Give me new stuff



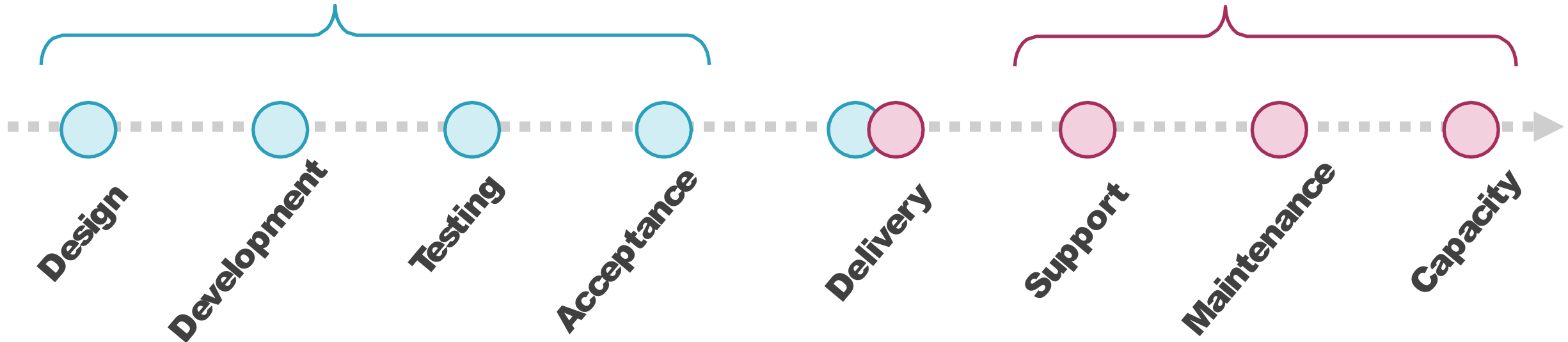
'The Business'

- **Different goals**
- **Different skillsets**
- **Different tools**
- **No common ground**

Development Team



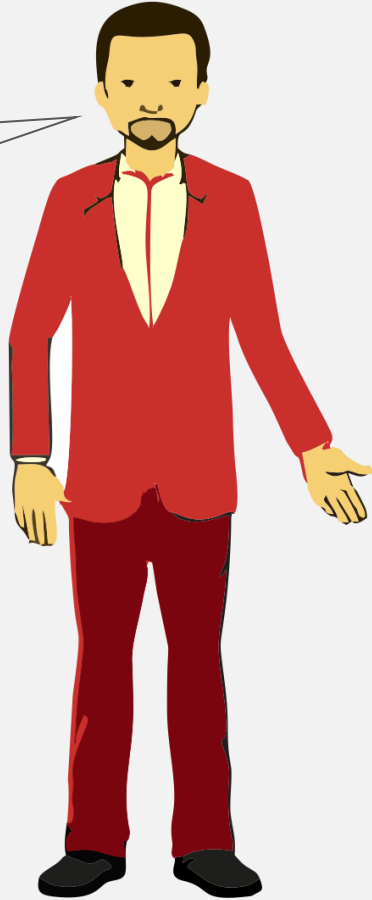
Ops Team



The Wall of Confusion

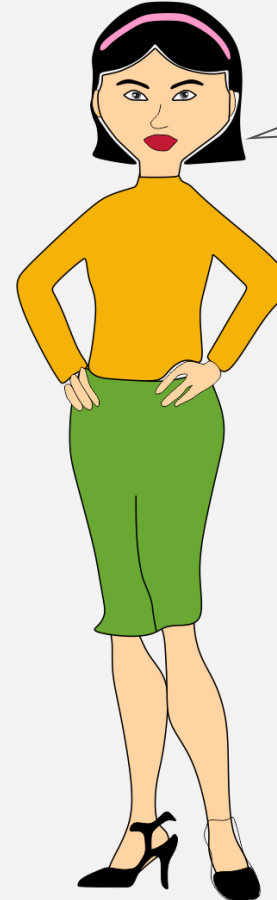
Development and Operations in Conflict!!

I want change
to deploy new
things



Development

The Wall of Confusion



I want stability
and do not want
interruptions in
the infrastructure

Operations

Development Team



Ops Team



Development Team



SRE Team

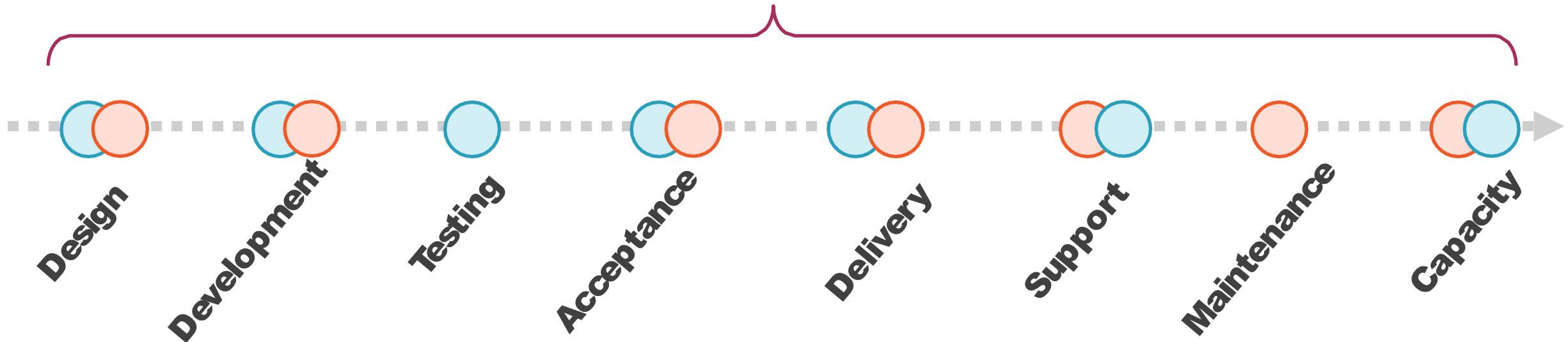


- **Shared goal**
- **Overlapping skillsets**
- **Consistent tools**
- **Common basis**

Development Team



SRE Team



Redefined Objective for IT organization

- Quality Release
- Immediate Release
- Cost Reduction

Development Team



Ops Team



DevOps Team



- **Significant investment**
- **Acceptance of change**
- **Needs outside help**
- **Uneven rollout**

DevOps Team



*Give me reliability
and new stuff*



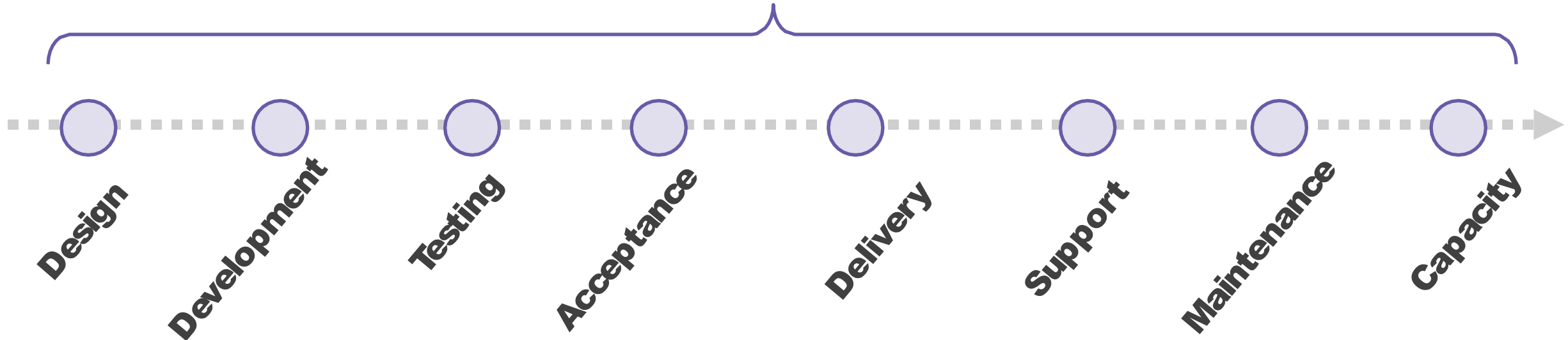
OK

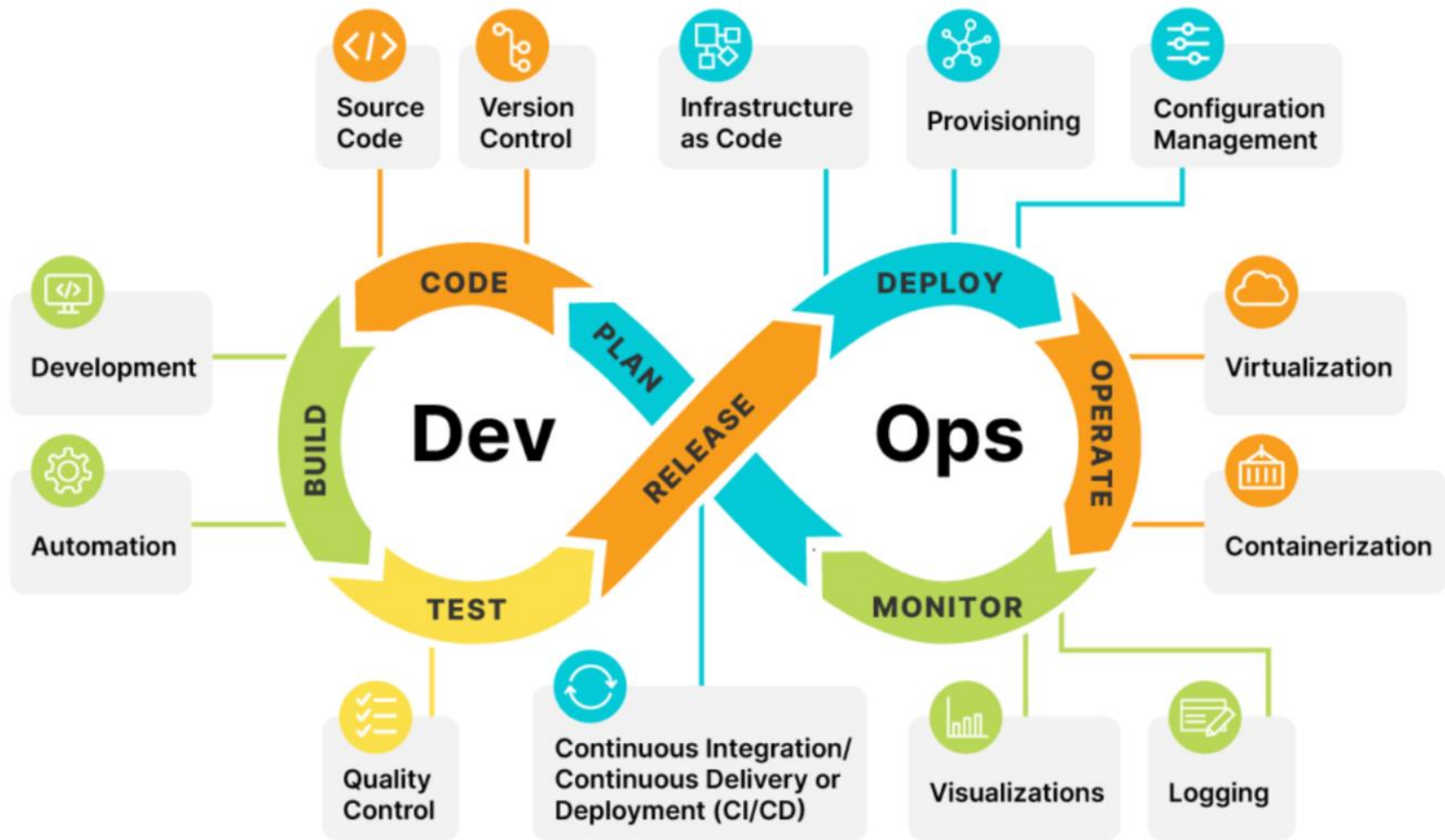


'The Business'

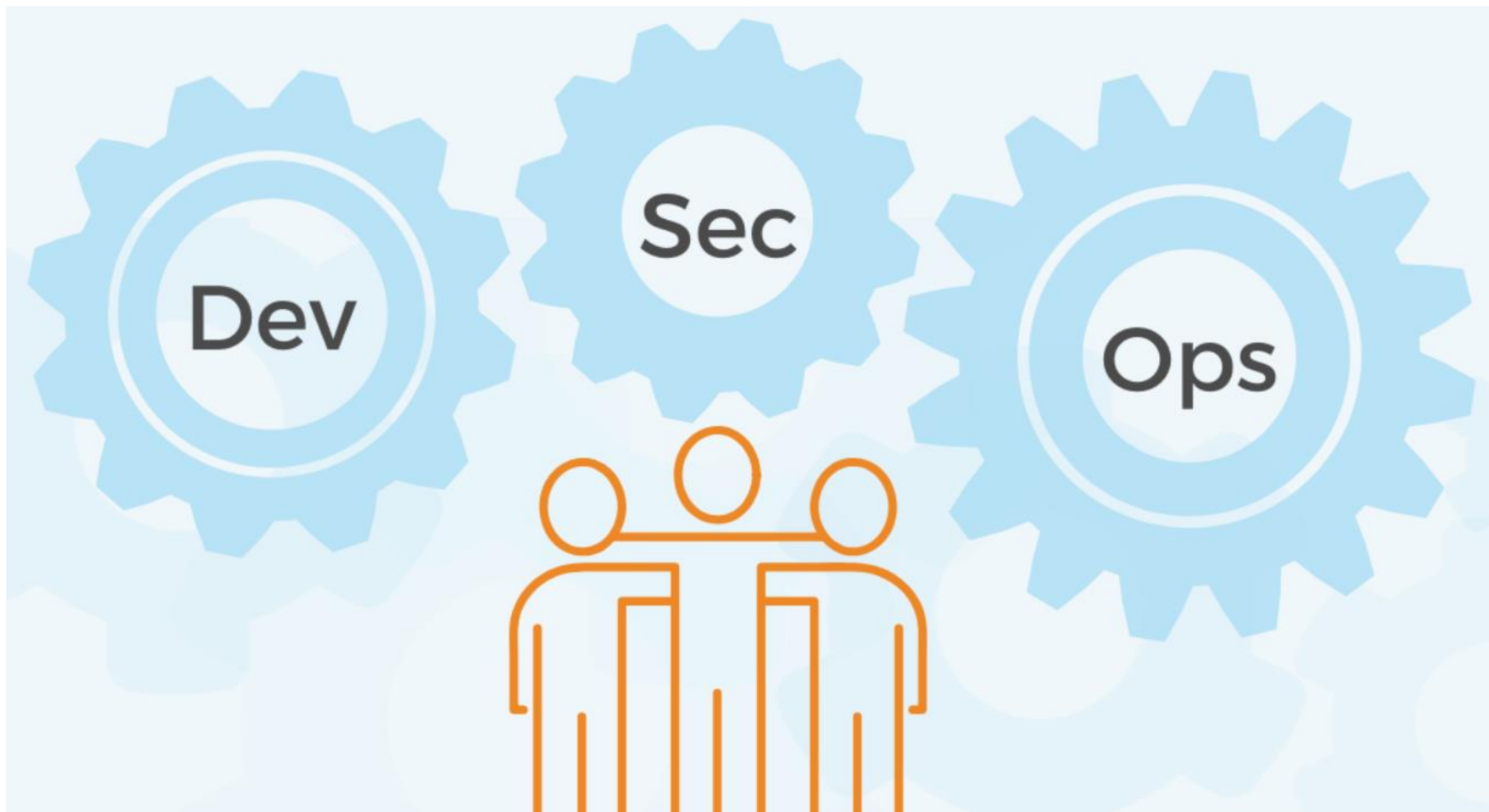
- **Shared goal**
- **Overlapping skillsets**
- **Consistent tools**
- **Common basis**

DevOps Team

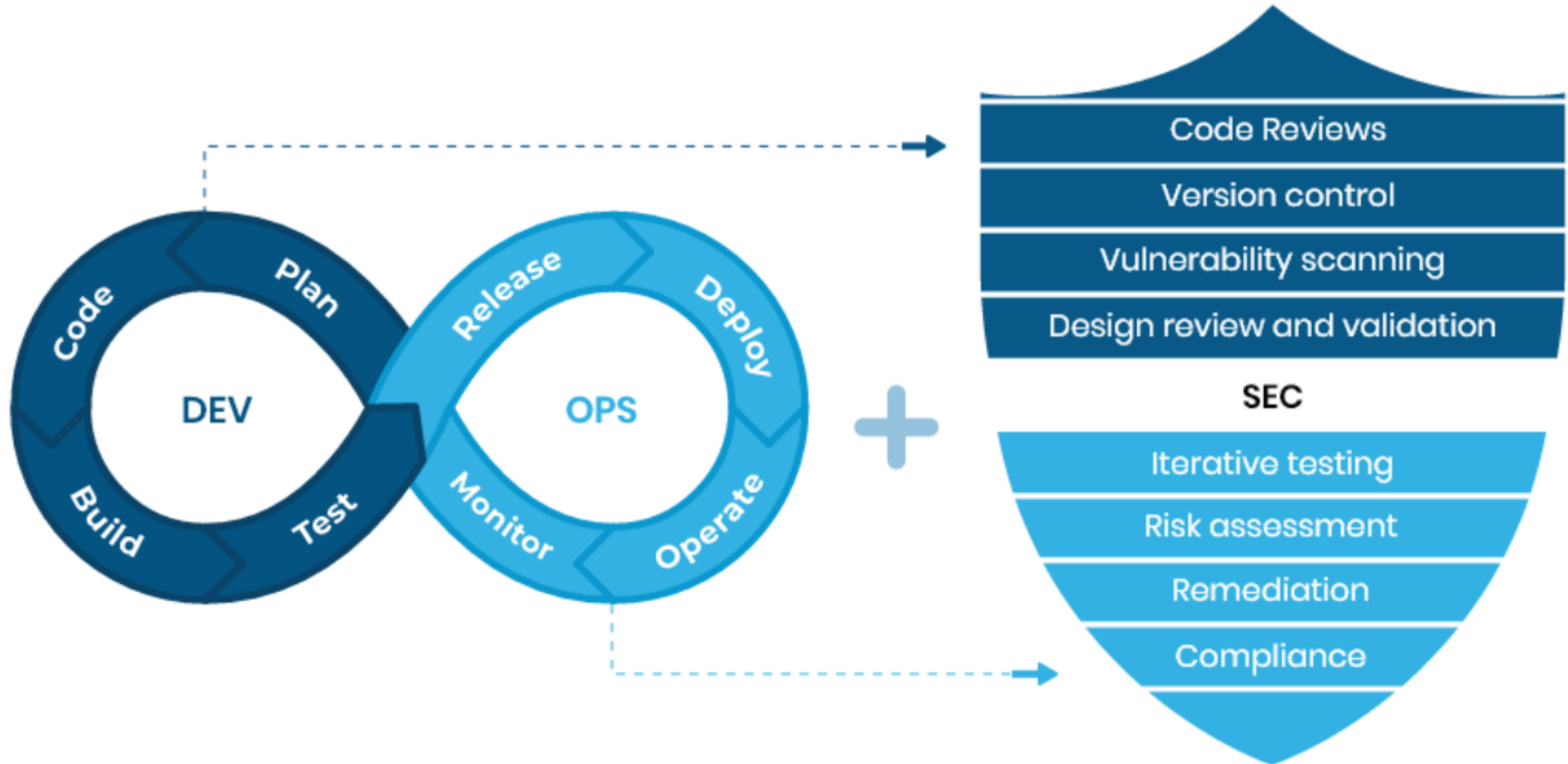




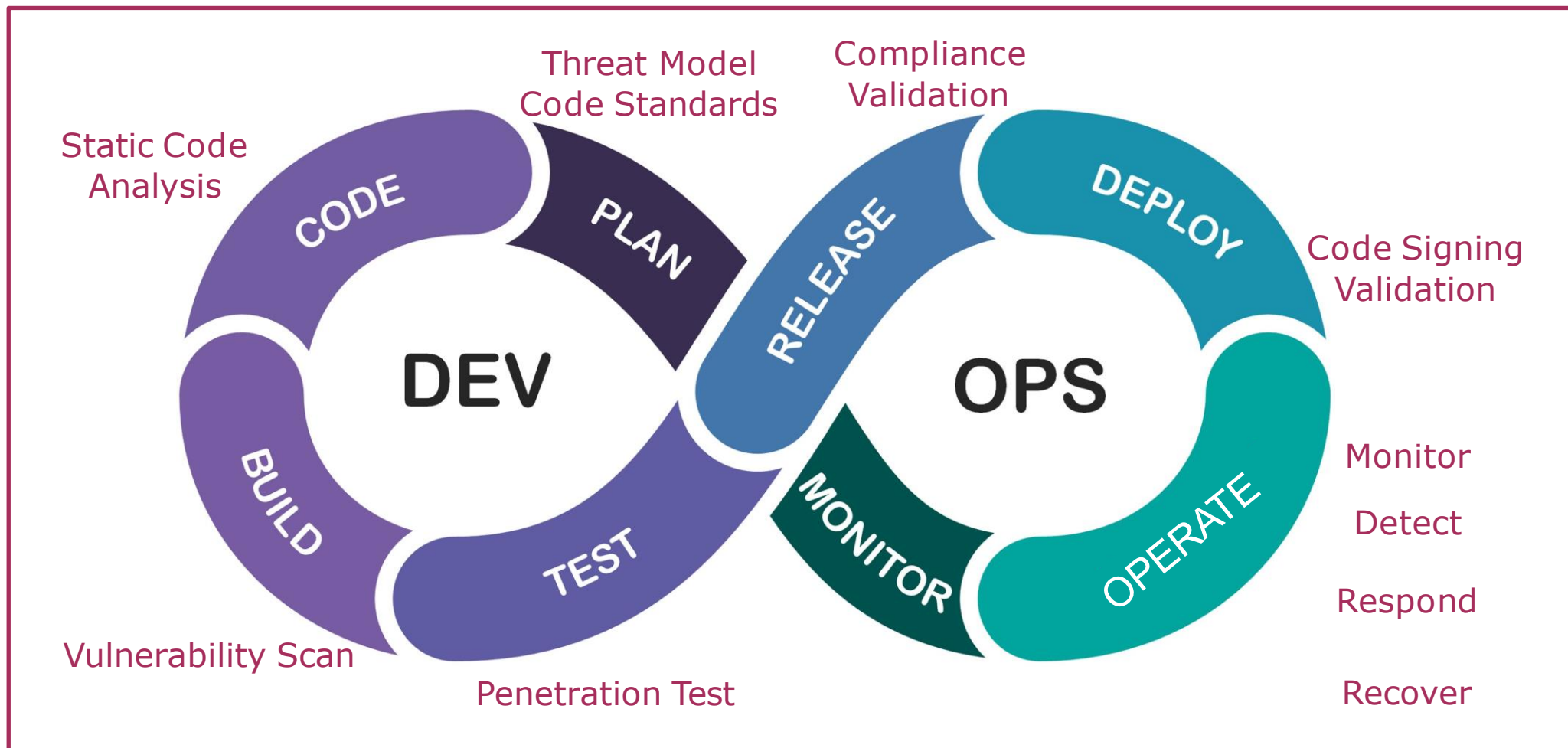




What is DevSecOps?



Positioning DevSecOps in Software Lifecycle





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1999



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2005



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2010

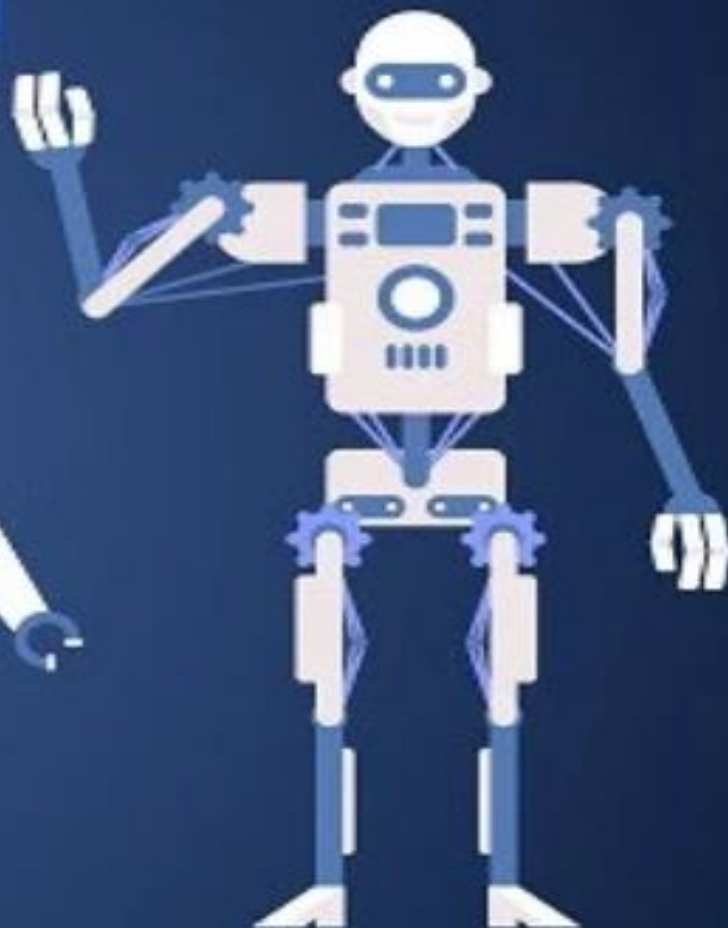


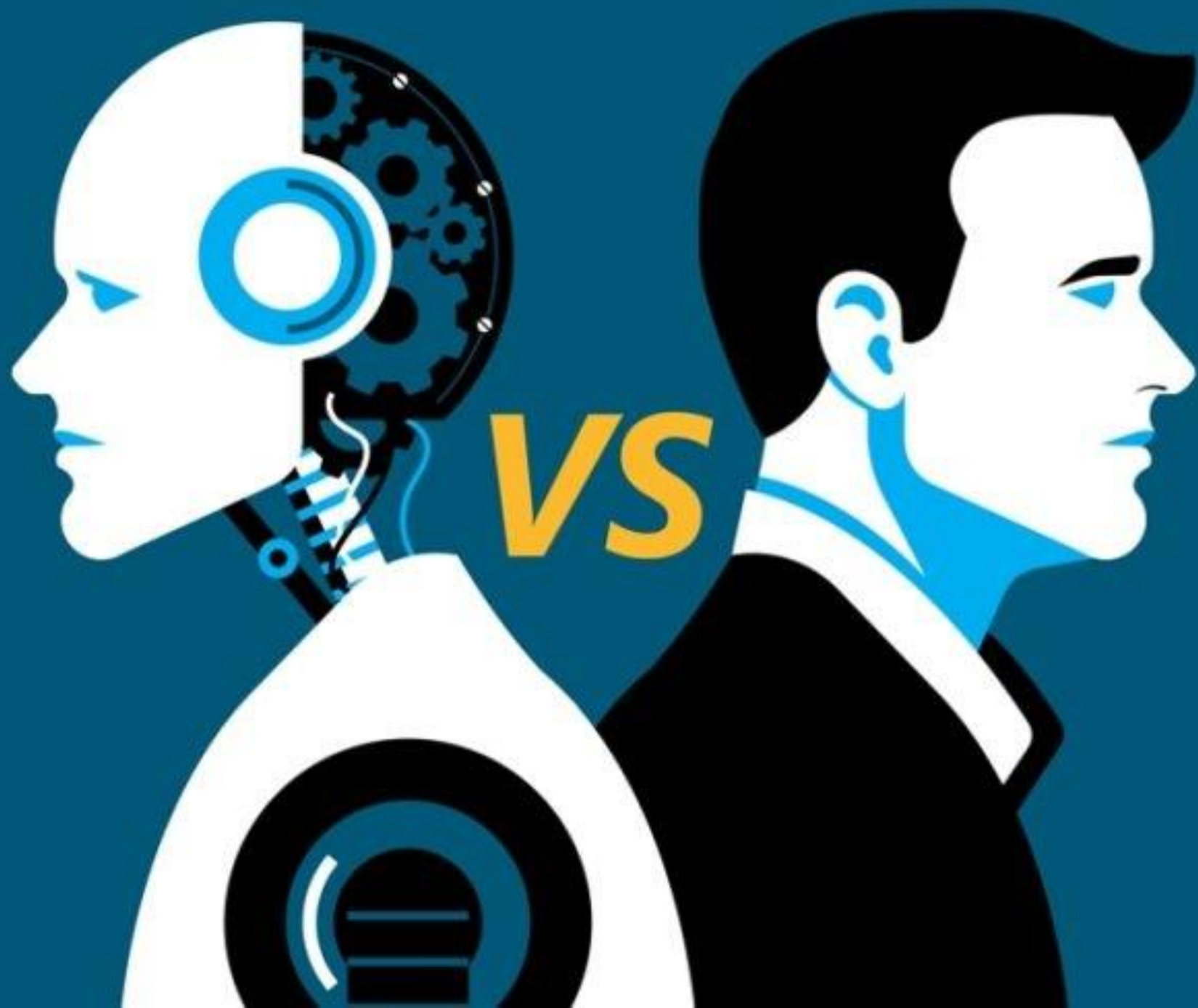
Lorem ipsum dolor sit amet, Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.

2015



2035

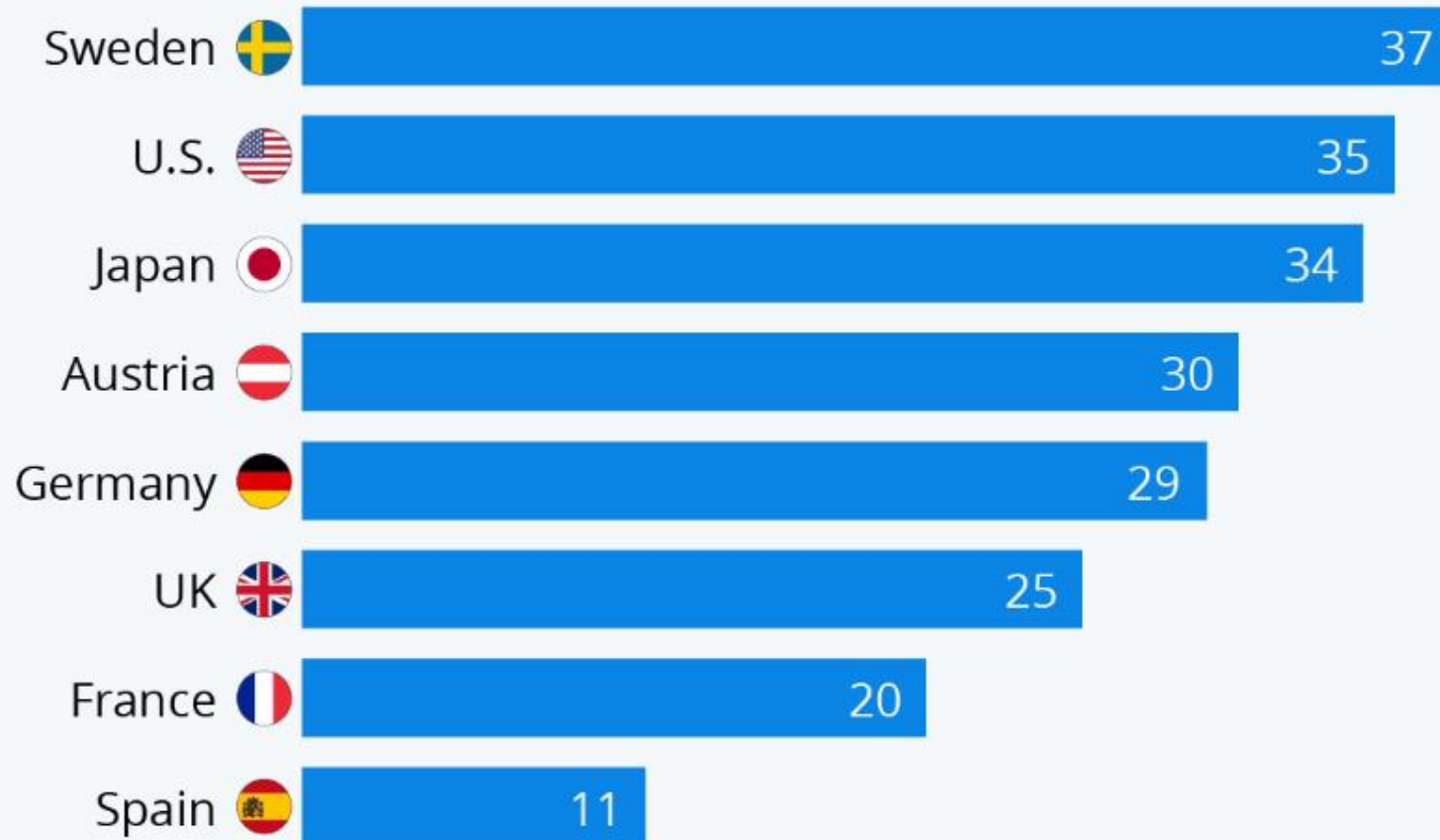




Where AI is Aiding Productivity



Projected increase in productivity due to AI
in selected economies until 2035 (in percent)



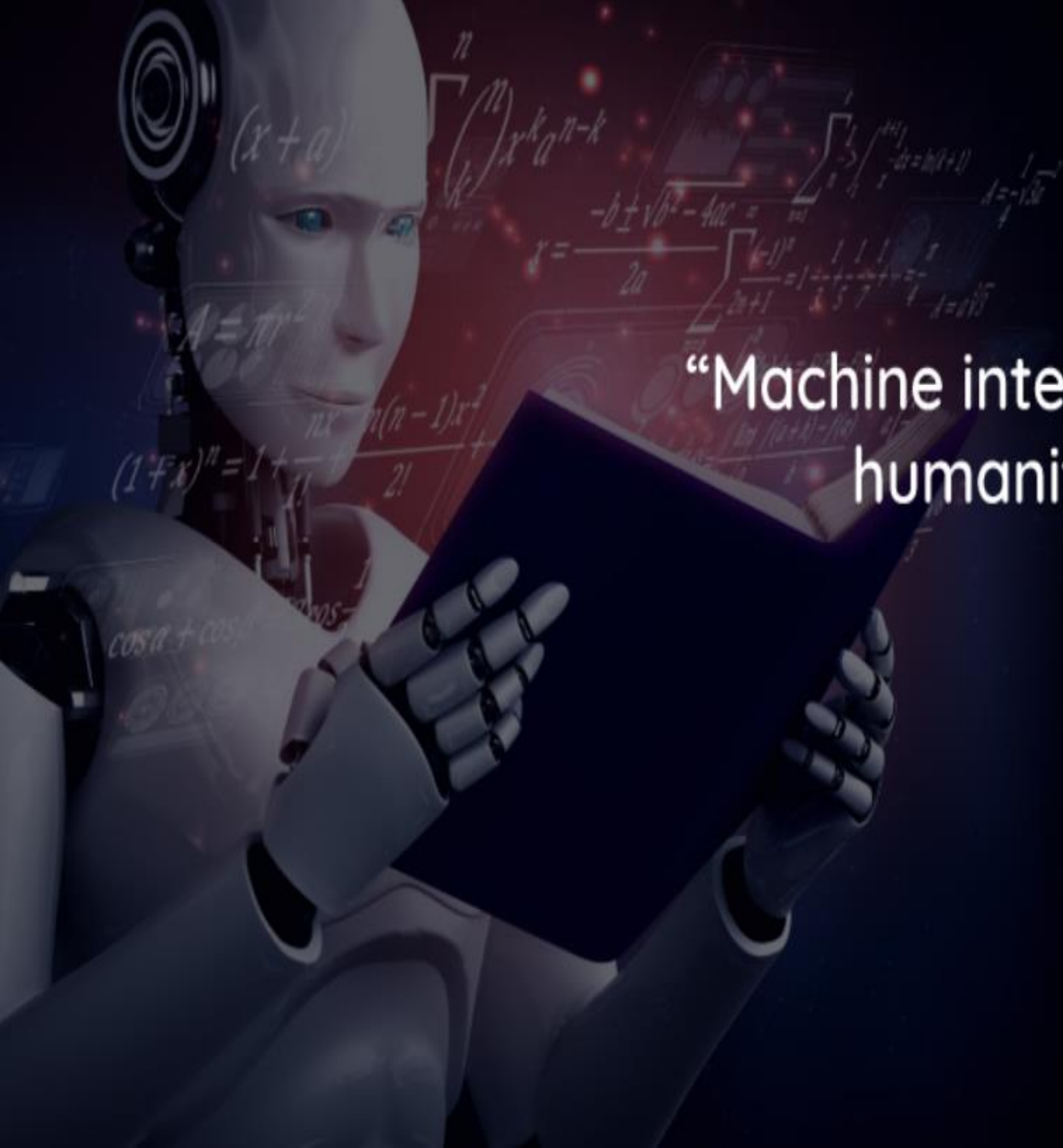
Sources: Accenture, Frontier Economics

AI will not replace humans,
but humans with AI will
replace humans without AI.



**No one can stop the
progress of artificial
intelligence; it will
inevitably be a central
force in our future.**

– Max Tegmark



“Machine intelligence is the last invention that humanity will ever need to make.”

- Nick Bostrom



“Predicting the future isn’t magic,
it’s artificial intelligence.”

- Dave Waters



**Artificial intelligence is
a tool, not a threat.**

- Rodney Brooks

**AI Will Replace
Those Who Don't Know
How to Use AI.**

HOW DOES AI WORK

Choosing a Model and Training

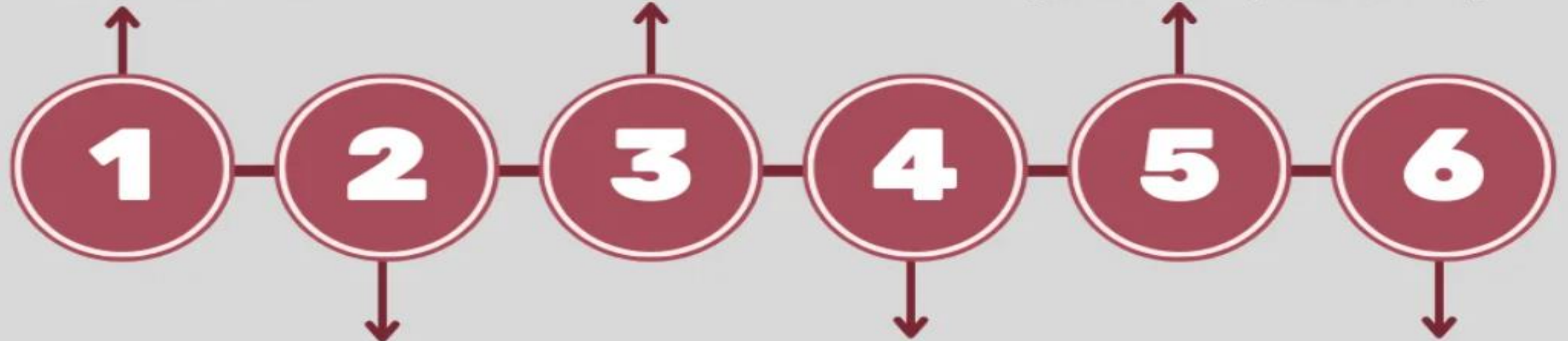
Data Collection

AI begins with gathering large amounts of data for training.

A suitable model is chosen for the specific problem. It's trained with data, fine-tuning its parameters to match the identified patterns and correlations.

Tuning

The model is fine-tuned by adjusting parameters to improve its accuracy.



Data Preparation:

The collected data is then cleaned and organized to be used effectively.

Evaluation

After training, the model is tested with new data to assess its performance and accuracy.

Deployment

Once satisfactory, the AI model is deployed for real-world use

What is AI Model ?

**Data
Acquisition**



**Model
Selection**



Training

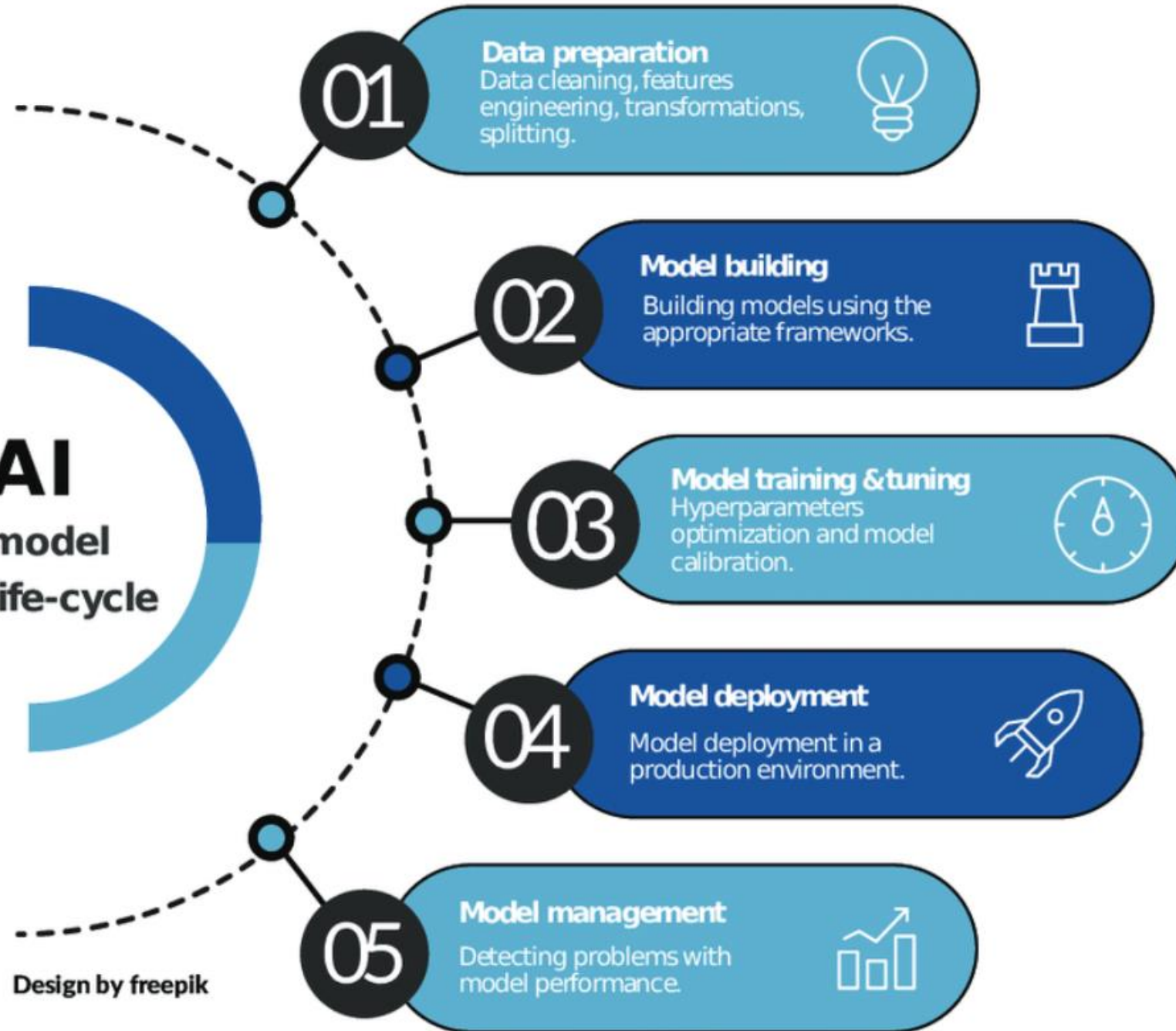
Deployment



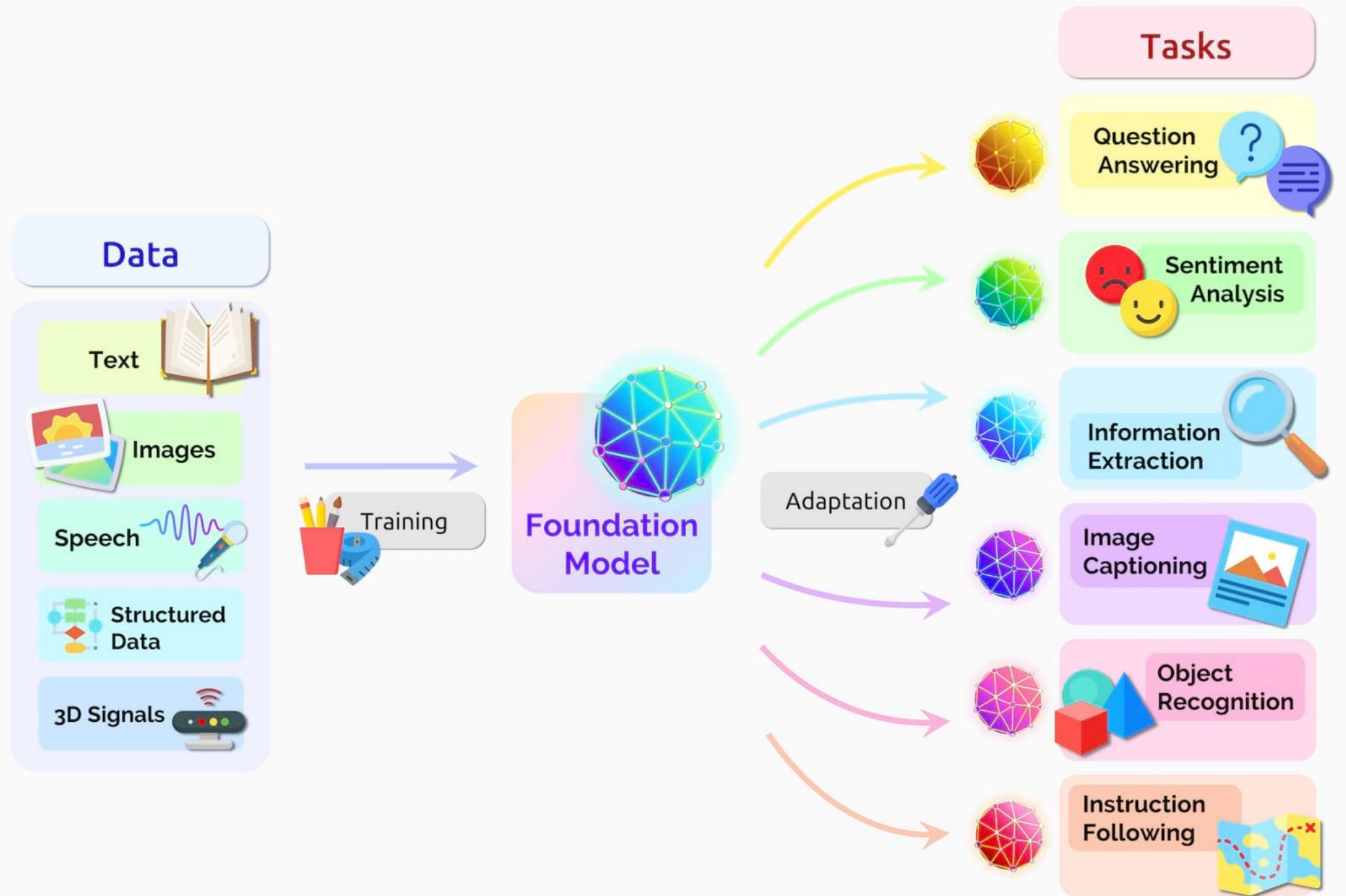
Evaluation



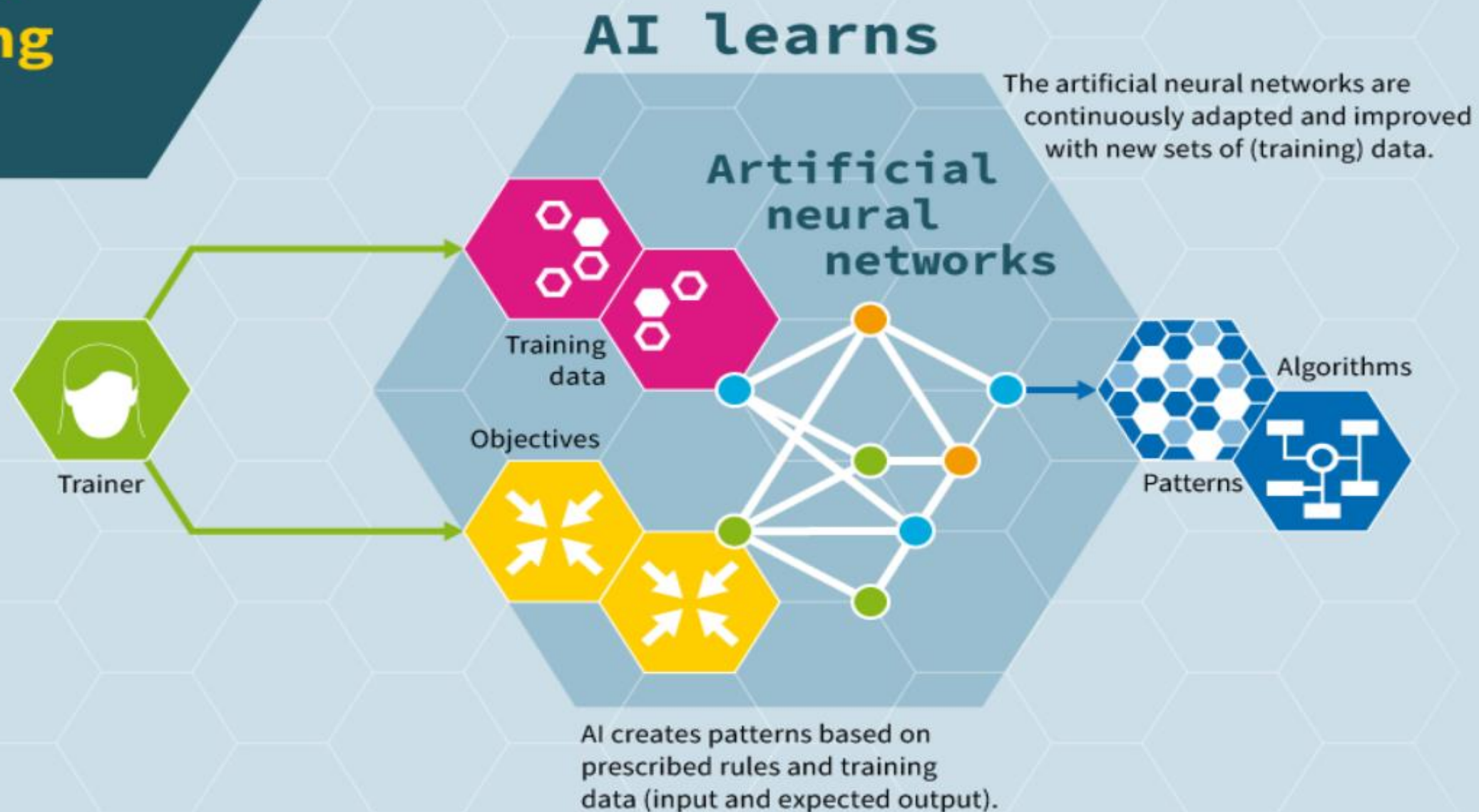
AI model life-cycle



Design by freepik

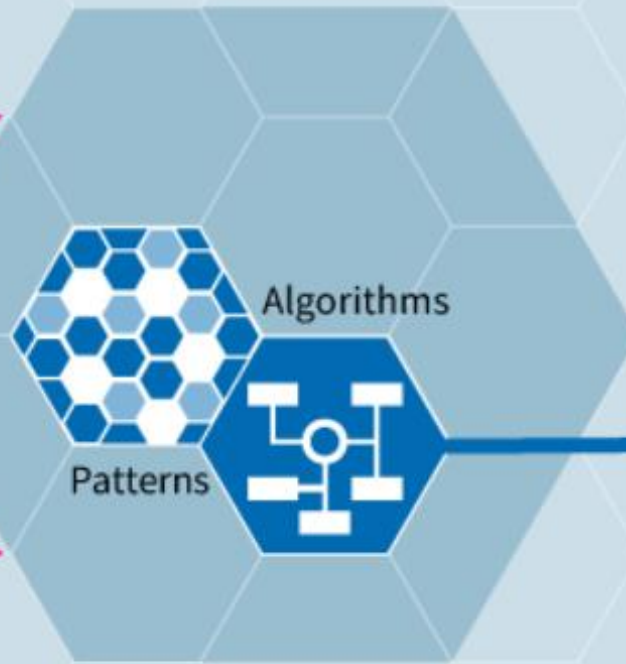


HOW DOES machine learning WORK?



AI works

Input data



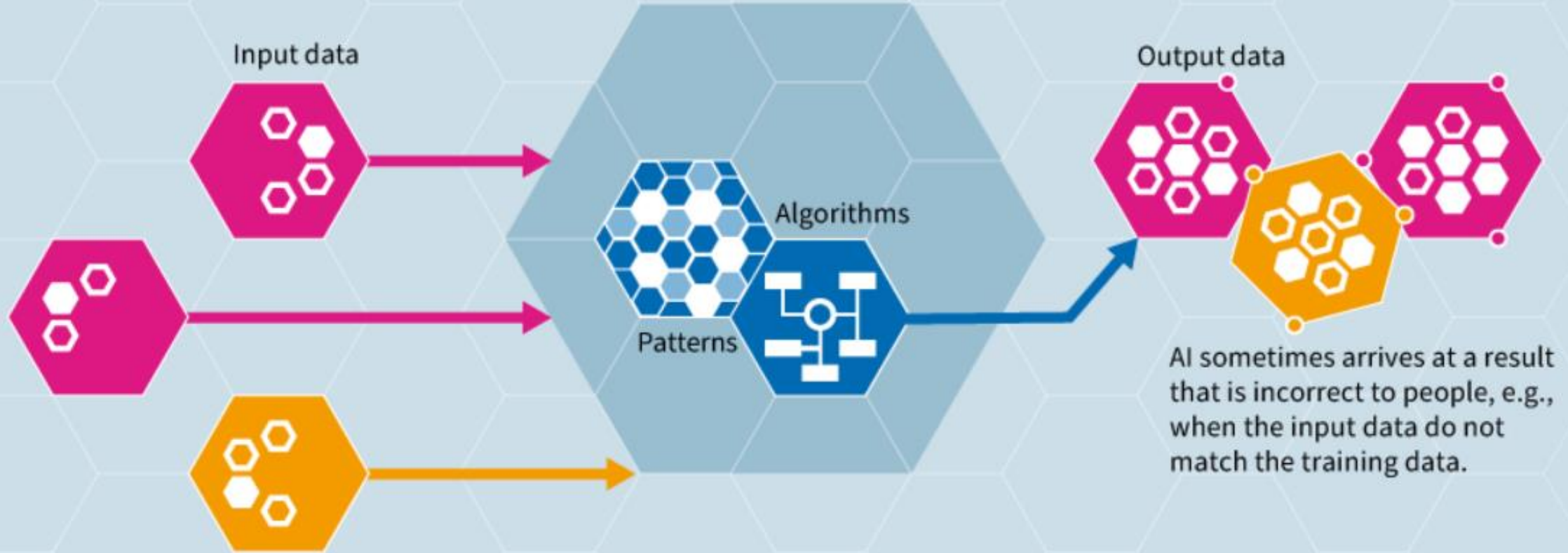
Output data



Output data are the result of AI processing.

AI analyzes the data based on the patterns it has learned and the algorithms it has created.

AI makes mistakes



A Talk about DevOps, Security, and AI



There cannot be a more important thing for an engineer, for a product team, than to work on the systems that drive our productivity.

*So I would, any day of the week, trade off features for our own **productivity**.*

I want our best engineers to work on our engineering systems, so that we can later on come back and build all of the new concepts we want.

– Satya Nadella, CEO, Microsoft

Software Development will change more in the next 5 years than it has in the last 40 years.

Martin Woodward, GitHub



With AI Co-Piloting Developers are **55% faster**

GitHub's Research, September 2022

It takes an hour to build an OpenAI Pull Request -reviewer by using OpenAI



GitHub Action

AI Code Review Action

v1.0.0

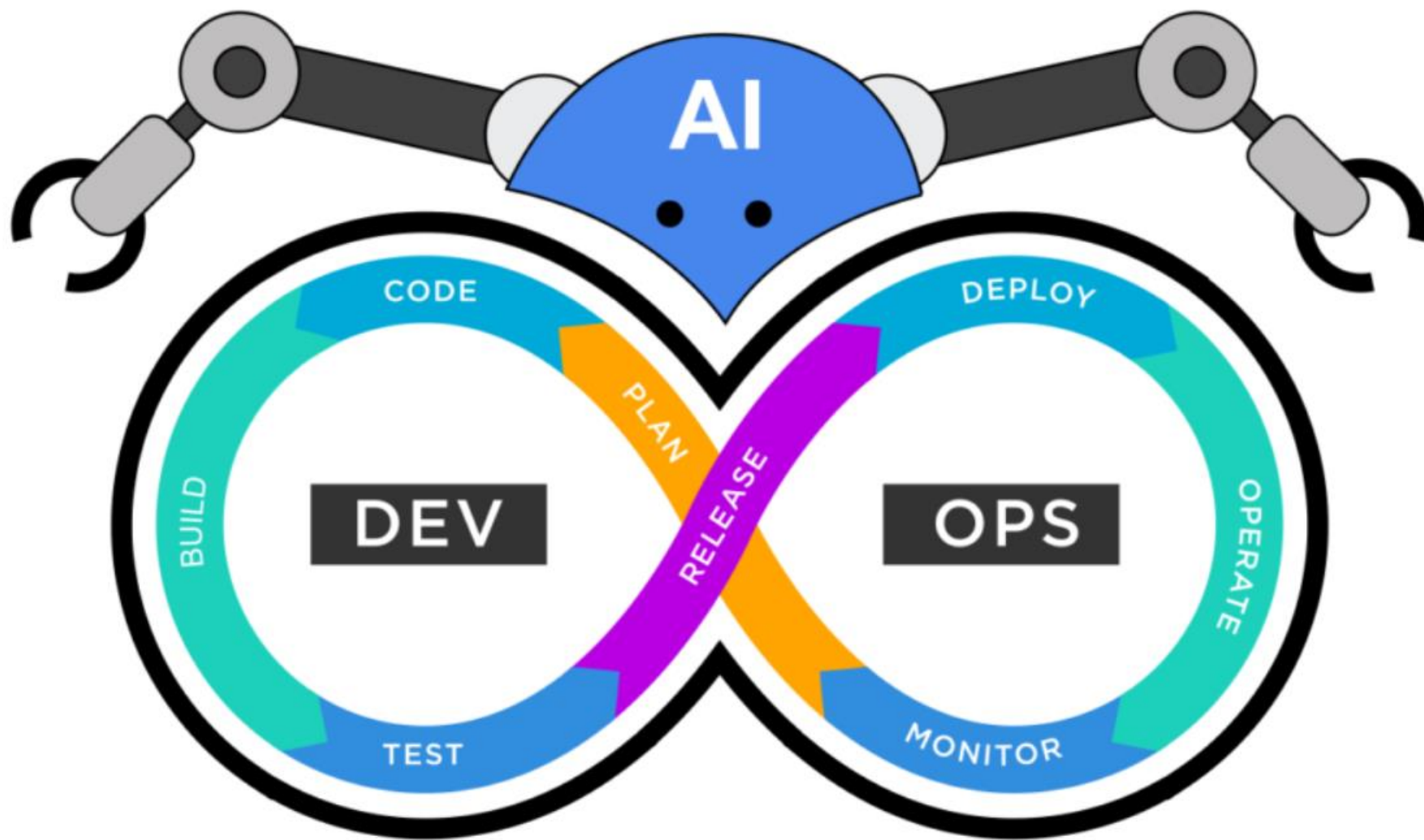
Latest version

AI Code Reviewer

AI Code Reviewer is a GitHub Action that leverages OpenAI's GPT-4 API feedback and suggestions on your pull requests. This powerful tool helps and saves developers time by automating the code review process.

Features

- Reviews pull requests using OpenAI's GPT-4 API.
- Provides intelligent comments and suggestions for improving your
- Filters out files that match specified exclude patterns



1

The survey findings shed light on the increasing integration of AI in

DevOps practices:





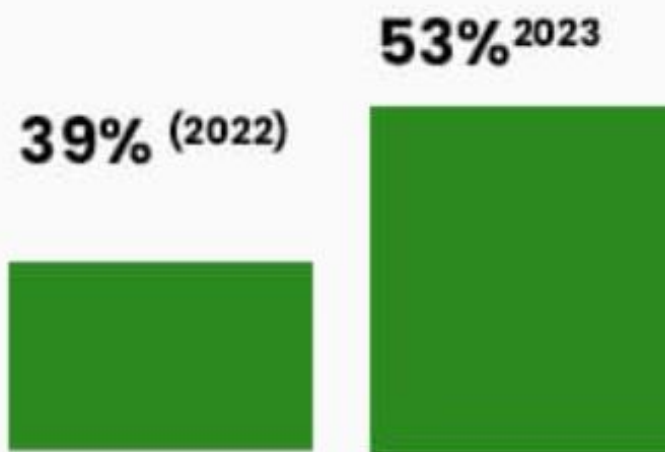
Code Check:

Notably, **62%** of developers are now utilizing **AI/ML for checking code**, showcasing a significant increase compared to the previous year.

3

Software Testing:

The adoption of AI/ML in software testing has seen substantial **growth**. **53%** of teams employ AI/ML in their testing processes, a significant jump from the 39% reported in 2022.





Code Review:

AI/ML is also leveraged by **36% of teams** to review **code**, providing an additional layer of code quality assurance.

5

Minimal Resistance:

Encouragingly, a mere 5% of teams expressed no plans to incorporate AI in DevOps, indicating high acceptance and recognition of its potential benefits.

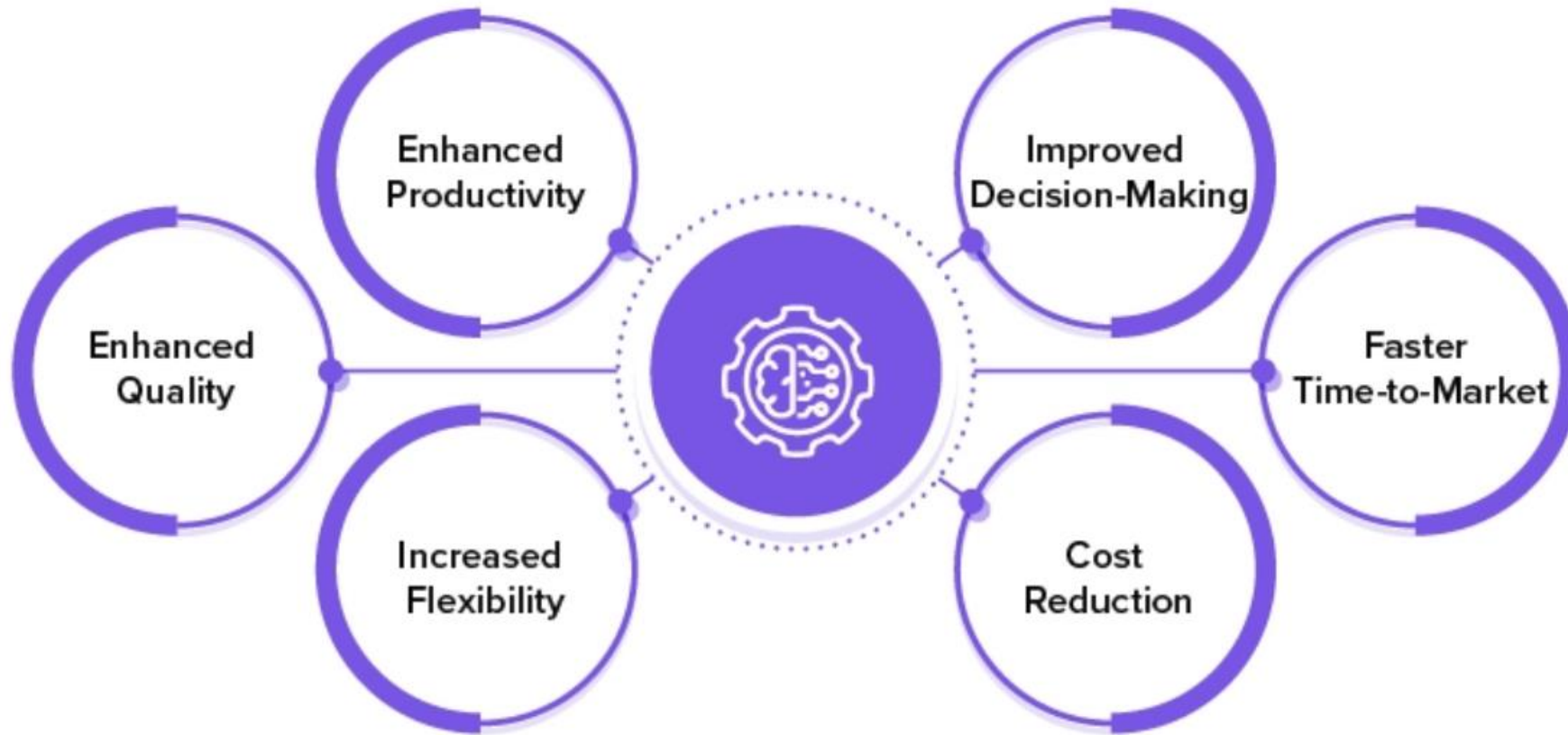


AI in DevOps – Top Benefits

- Automated Deployment
- Continuous Integration and Delivery
- Predictive Analytics
- Efficient Resource Allocation
- Intelligent Monitoring
- Automated Testing
- Enhanced Security
- Streamlined DevOps Workflow
- Improved Decision-making



Key Benefits of Integrating AI in DevOps



Benefits of Generative AI in DevOps



Optimized Application Performance



Faster Time-to-Market



Automation



Real-Time Threat Detection



Quick Response to Issues



Improved Quality

The Role of **AI and ML in Transforming DevOps**





How AI Is Transforming **DevOps**



AI In DevOps

The Symbiotic Relationship
And Its Benefits To Business



Automated Self-
Healing CI/CD Pipeline



Security At Scale



High App Availability
And Reduced Downtime



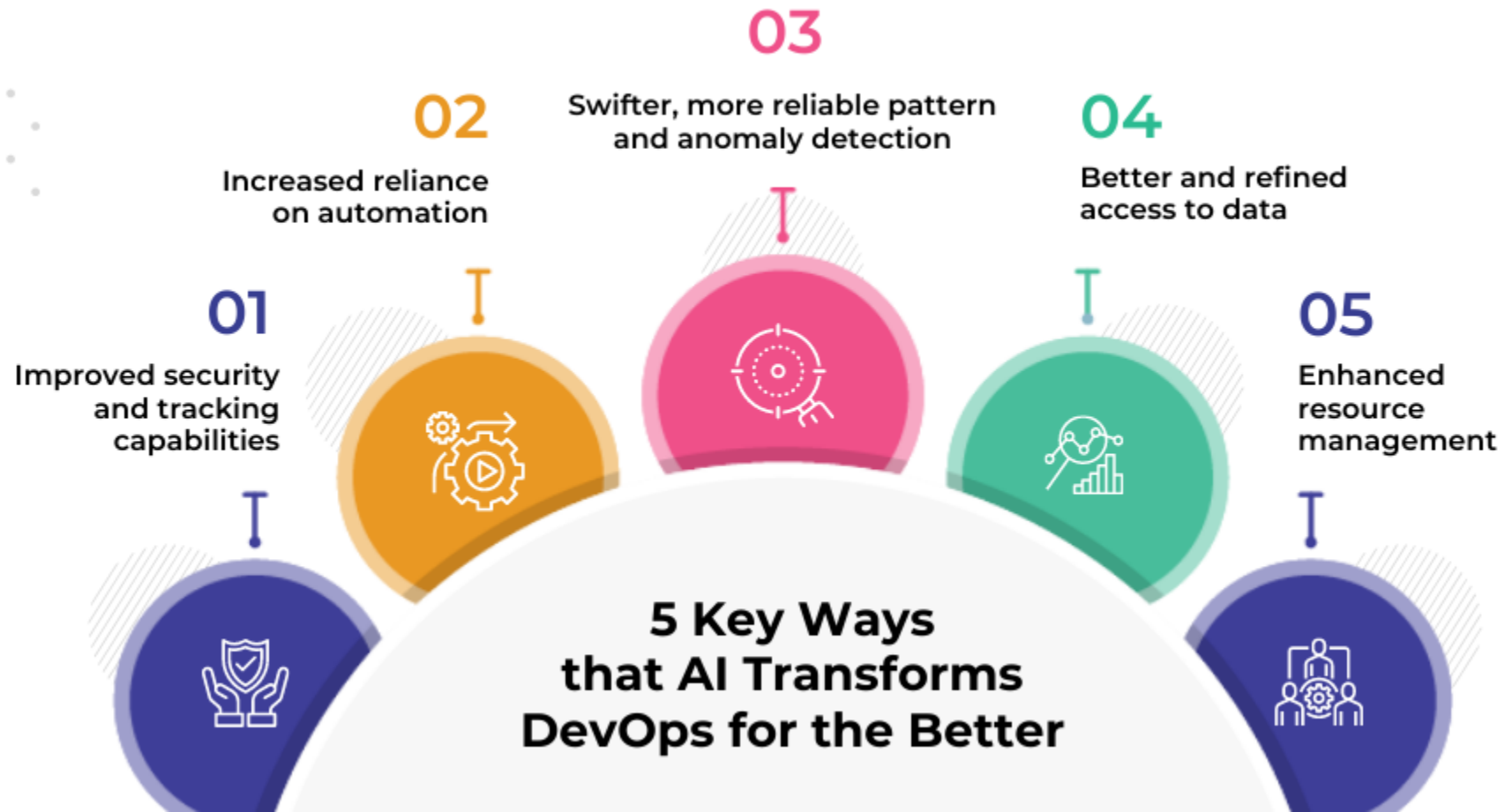
Optimises Deployment
And Release Management



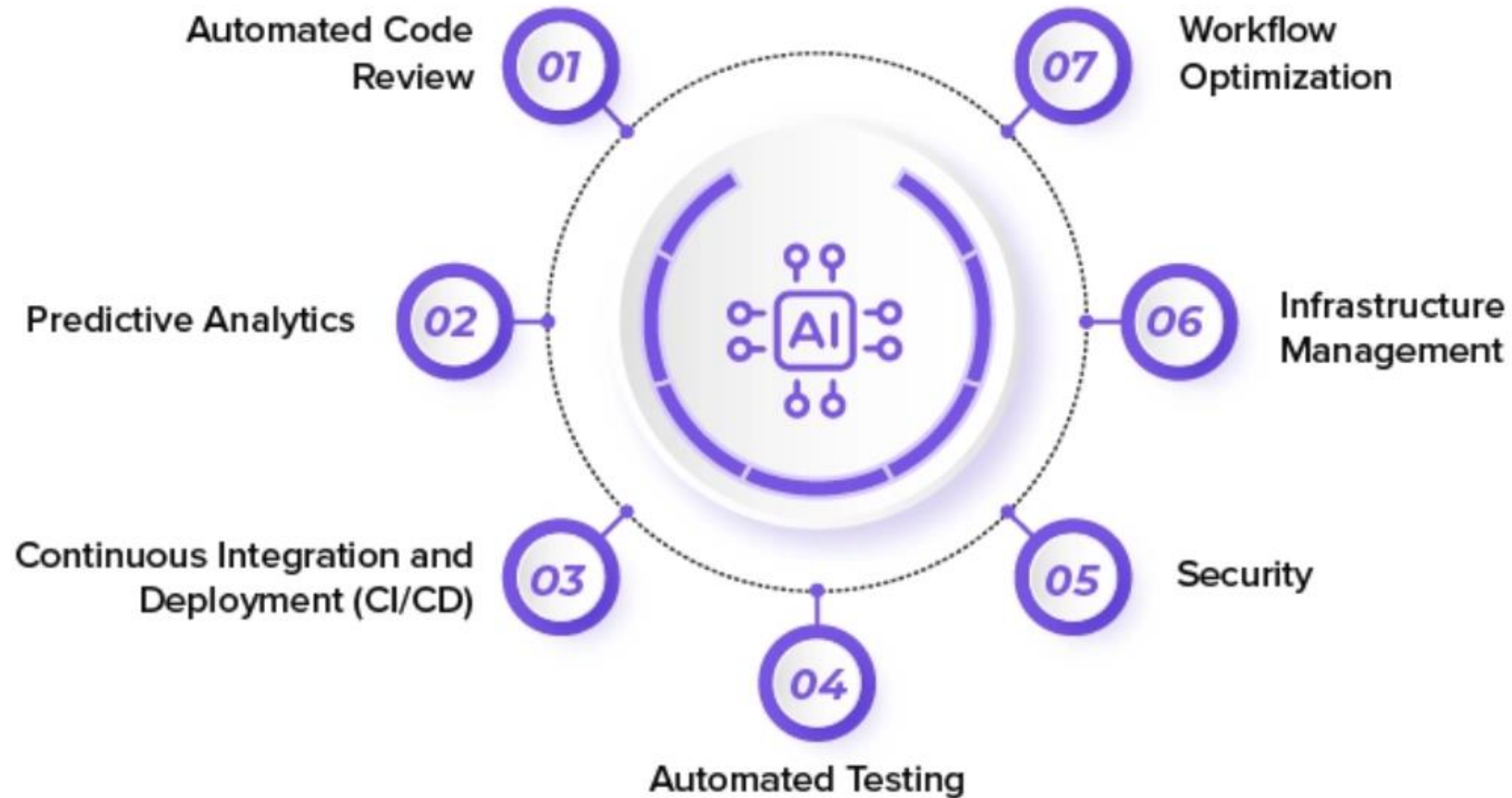
High Code Quality



50% Cost Reduction



Key Applications of AI in DevOps



AI in DevOps – Use Cases



Easy Access and
Management of
Data



Security



Software Testing



Alert Management



Superior
Implementation
Efficiency



Feedback Loop

Increased Collaboration



Pattern
Discovery



Analysis of
Trends and
Summary

Use Cases of AI
in **DevOps**



Monitor the
Delivery of the
Application

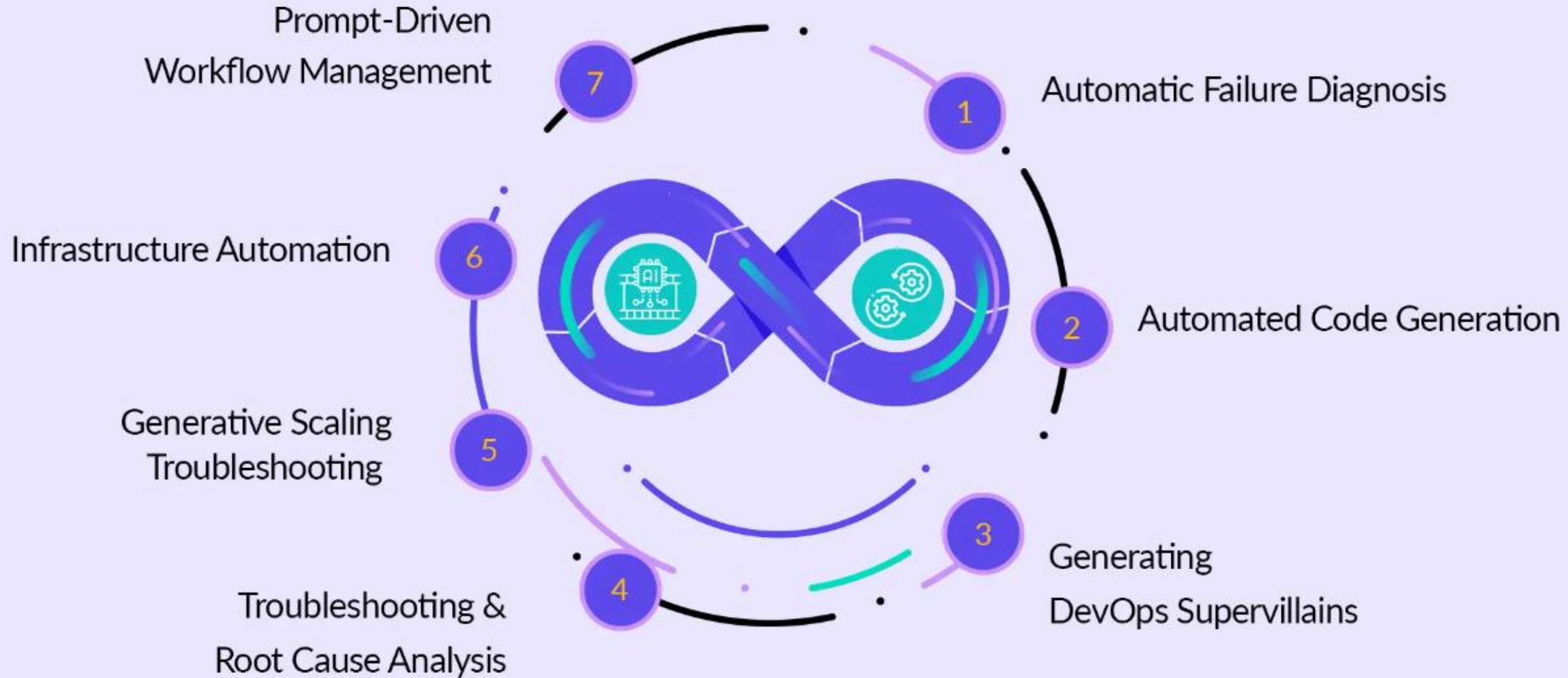


Automation

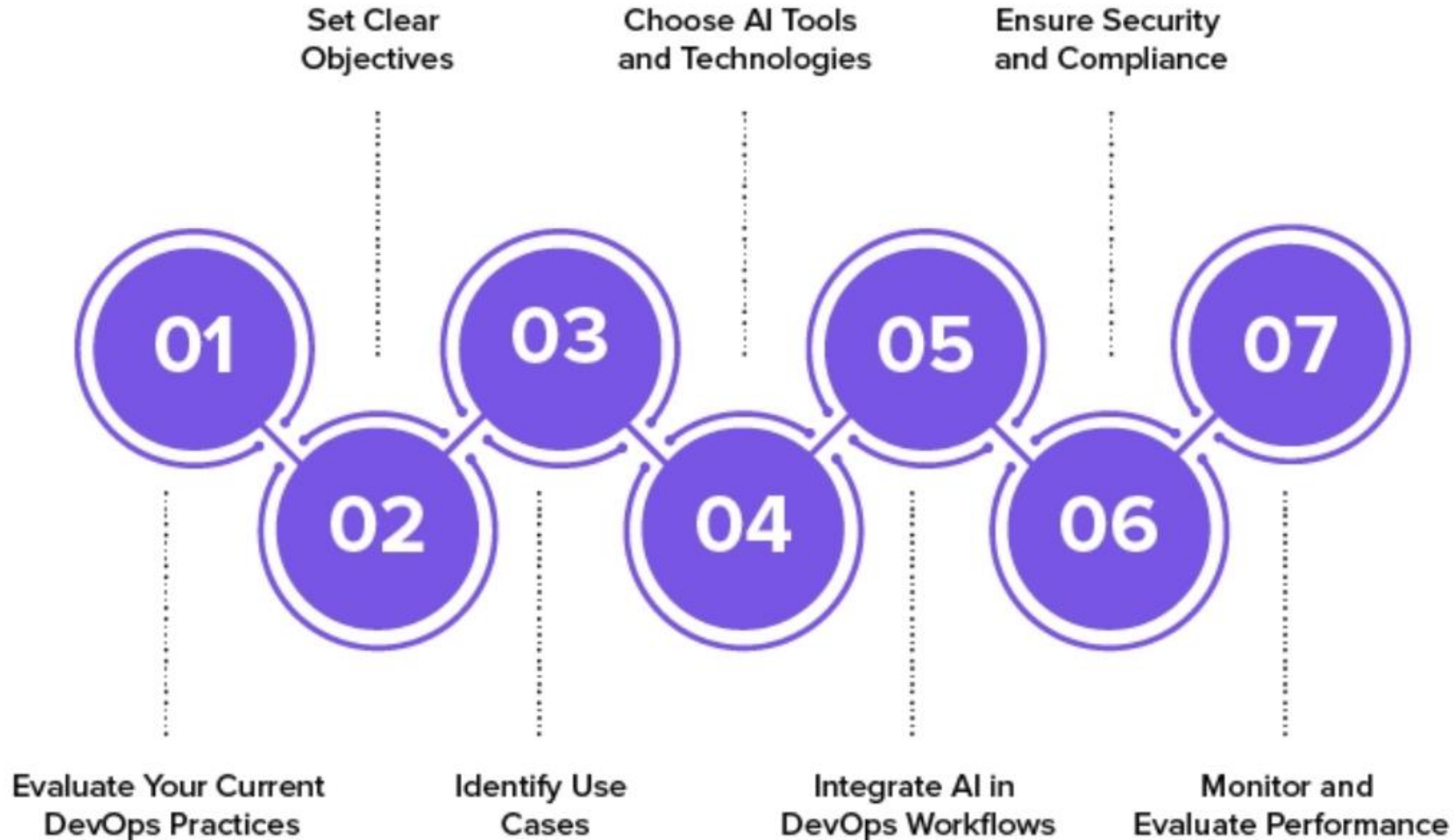




7 Ways How Generative AI will Transform {DevOps} Automation?



Key Steps to Implement AI in DevOps



Preparing Data



Developing AI Model



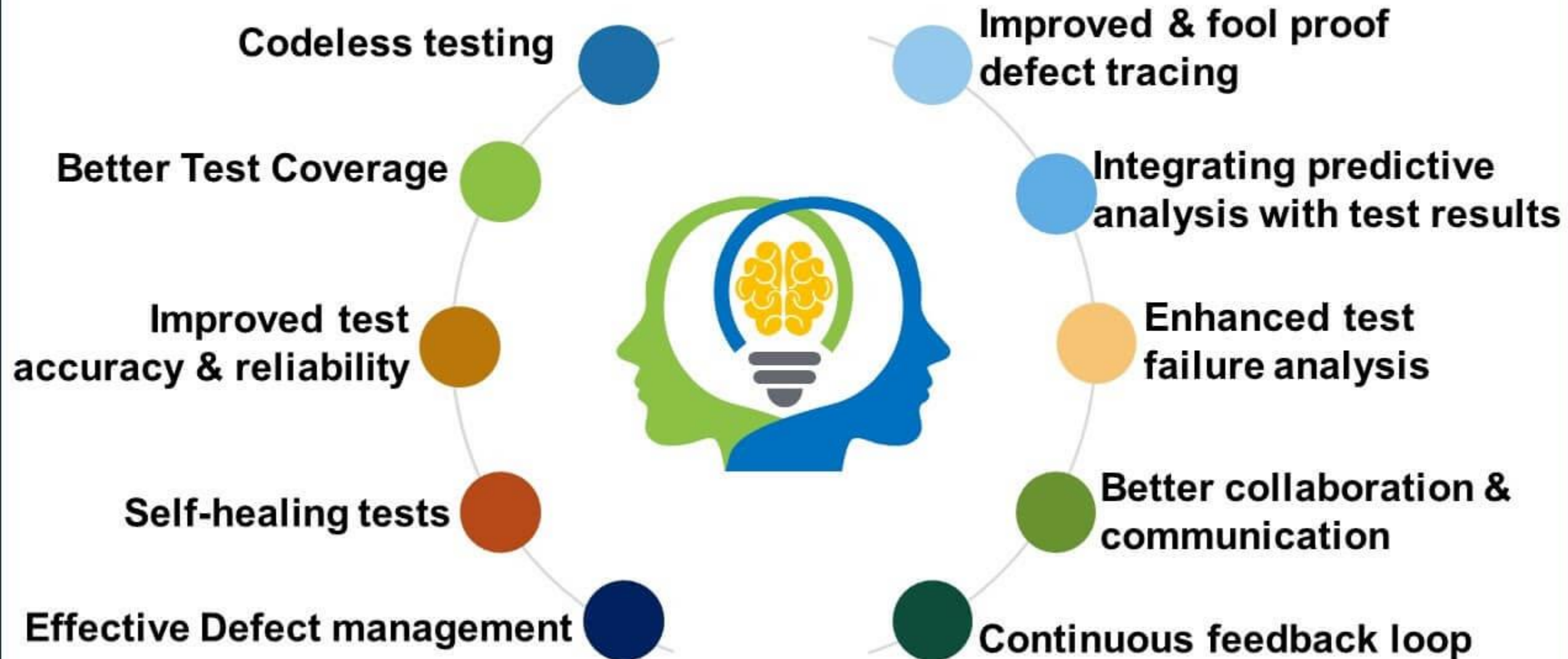
Deploying AI Model

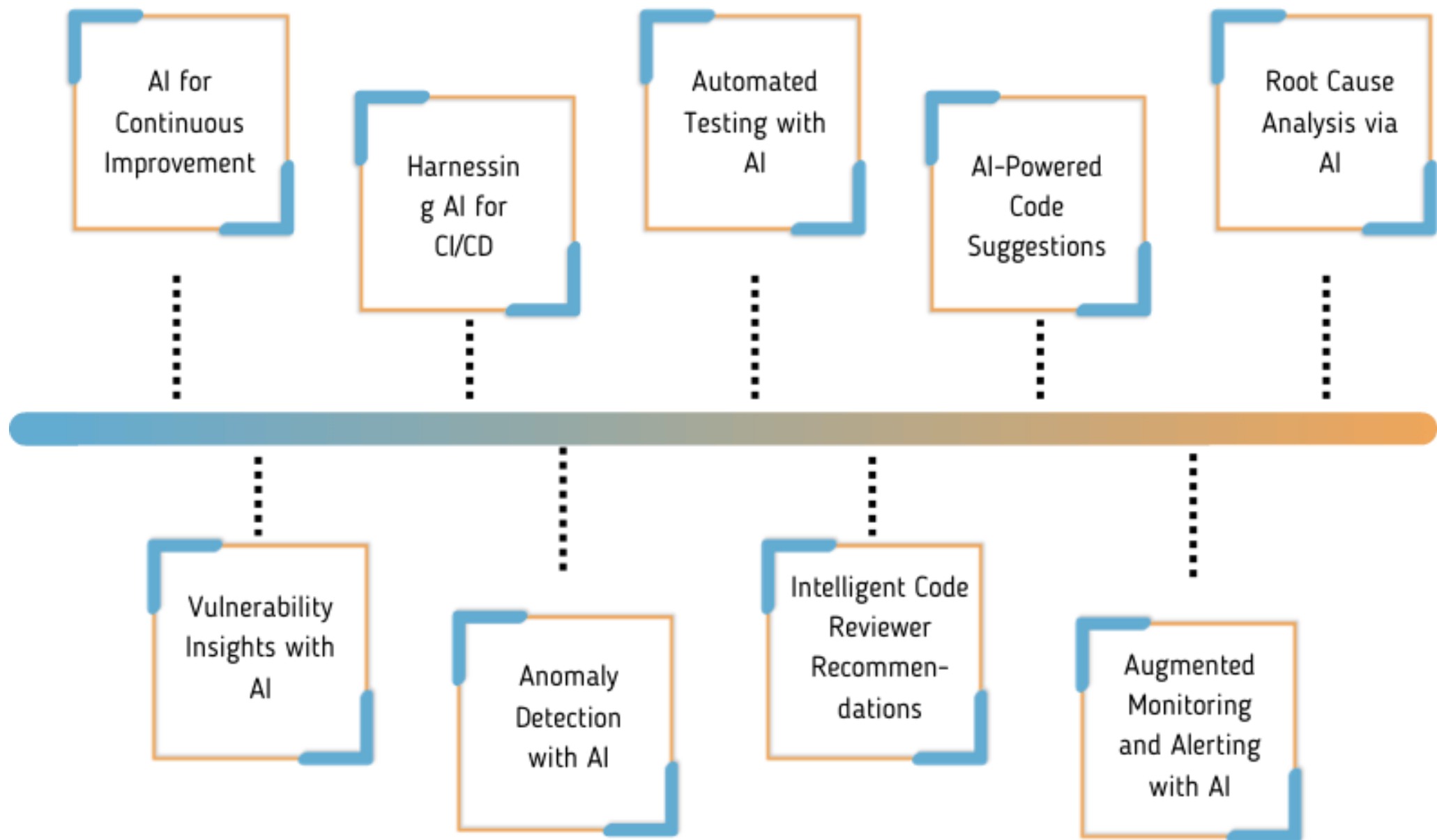


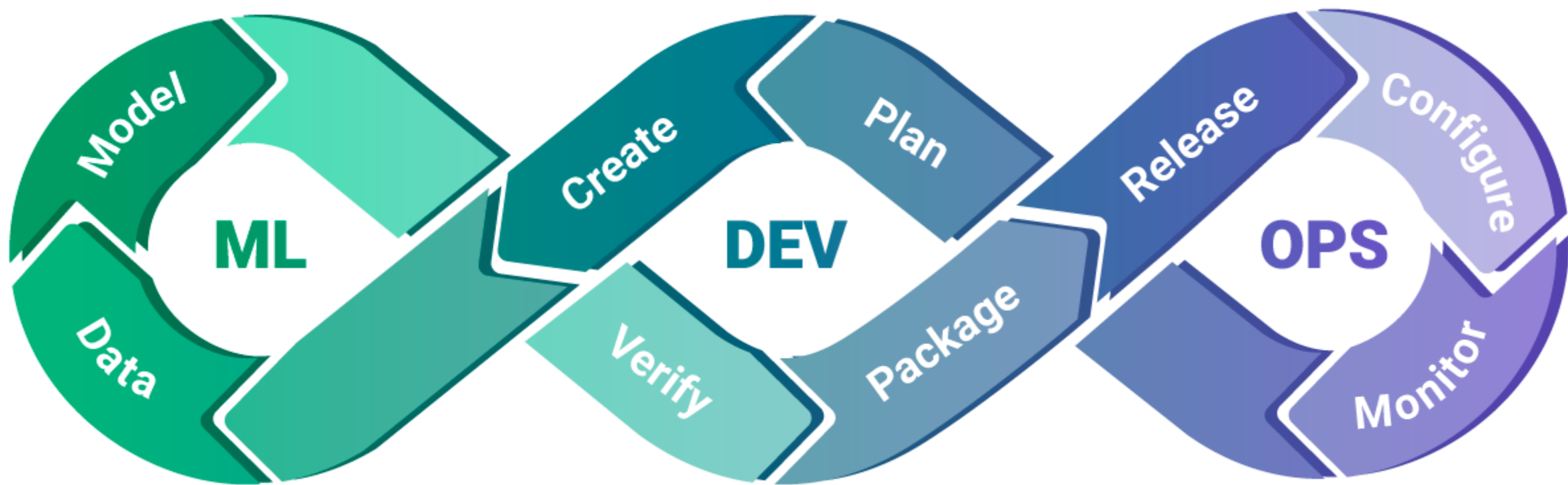
Monitoring AI Model



10 ways to accelerate DevOps with AI

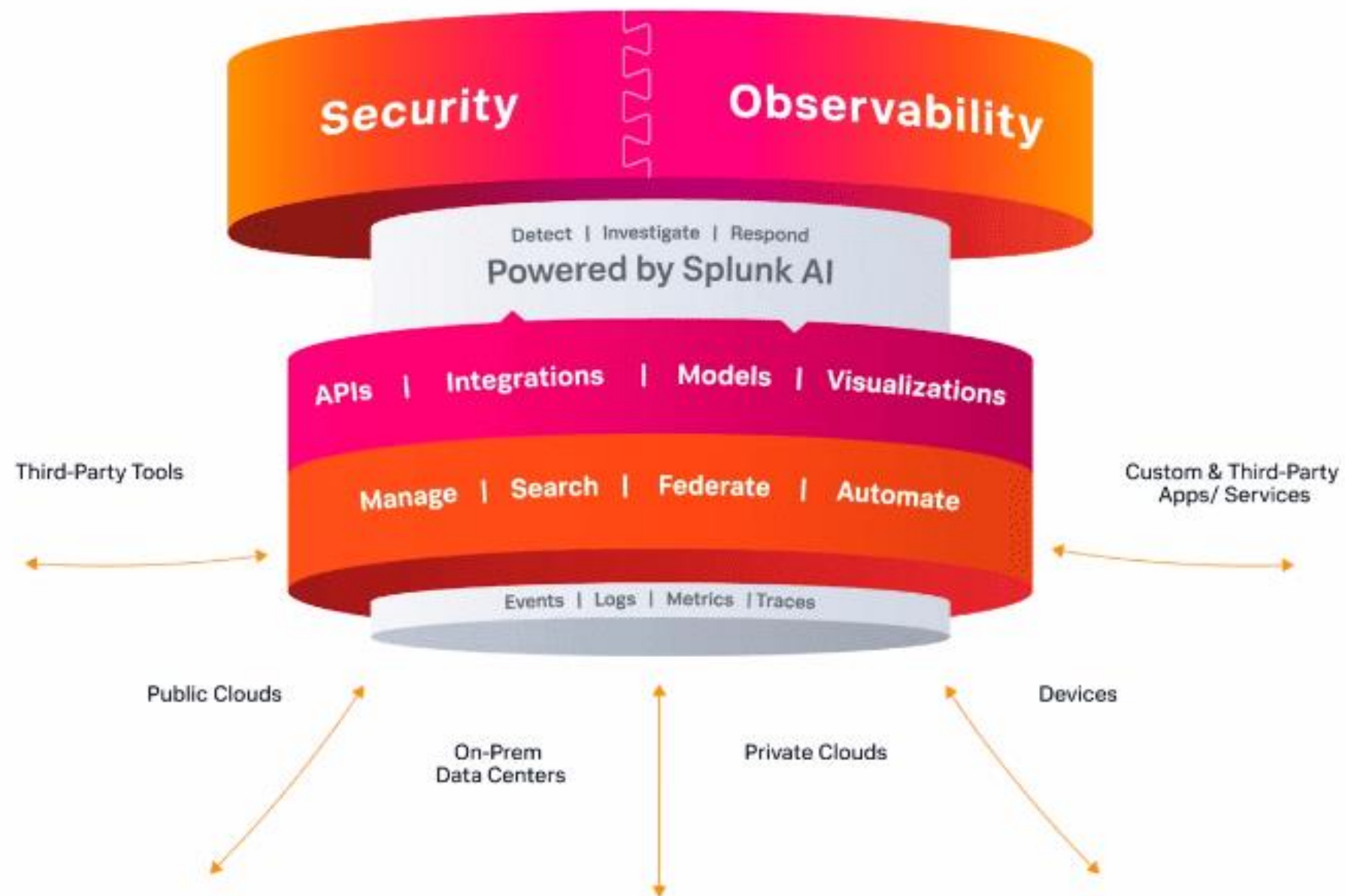


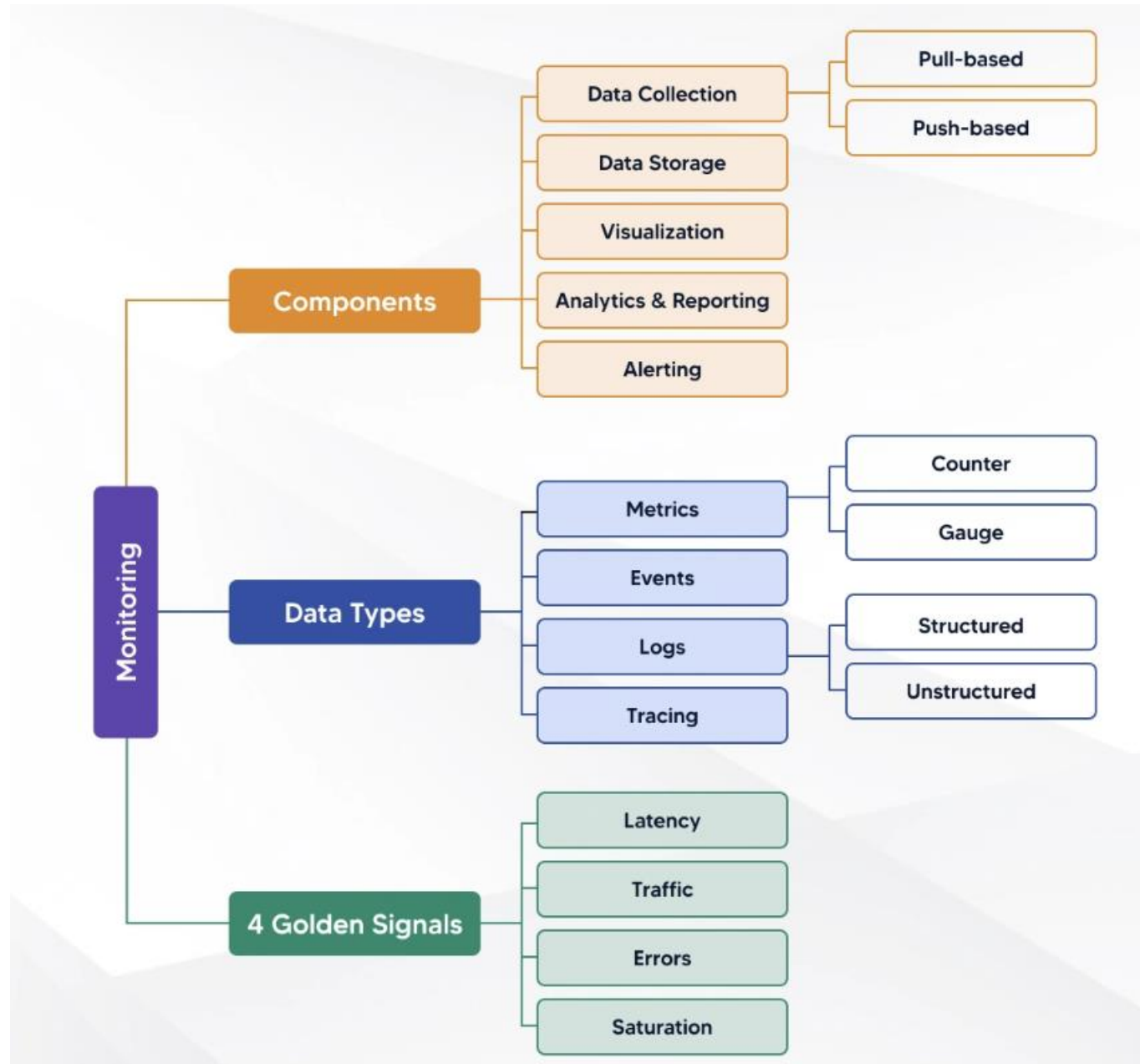




How Generative AI is reshaping Observability platforms?

- Enhanced understanding through Data Synthesis:
- Anomaly detection and pattern recognition:
- Dynamic adaptability to system changes:
- Creative problem-solving in observability:
- Improving explainability and interpretability:
- Customization for diverse use cases:
- Optimizing resource utilization:
- Real-Time analysis and adaptation:





Characteristics

Metrics

Internal
Characteristics

Metadata

External
Characteristics

Examples

Uniqueness,
cardinality
numerical
distributions,
nullness

Examples

Schema,
freshness,
number of rows

Relationships

Lineage

Dependencies
within data

Logs

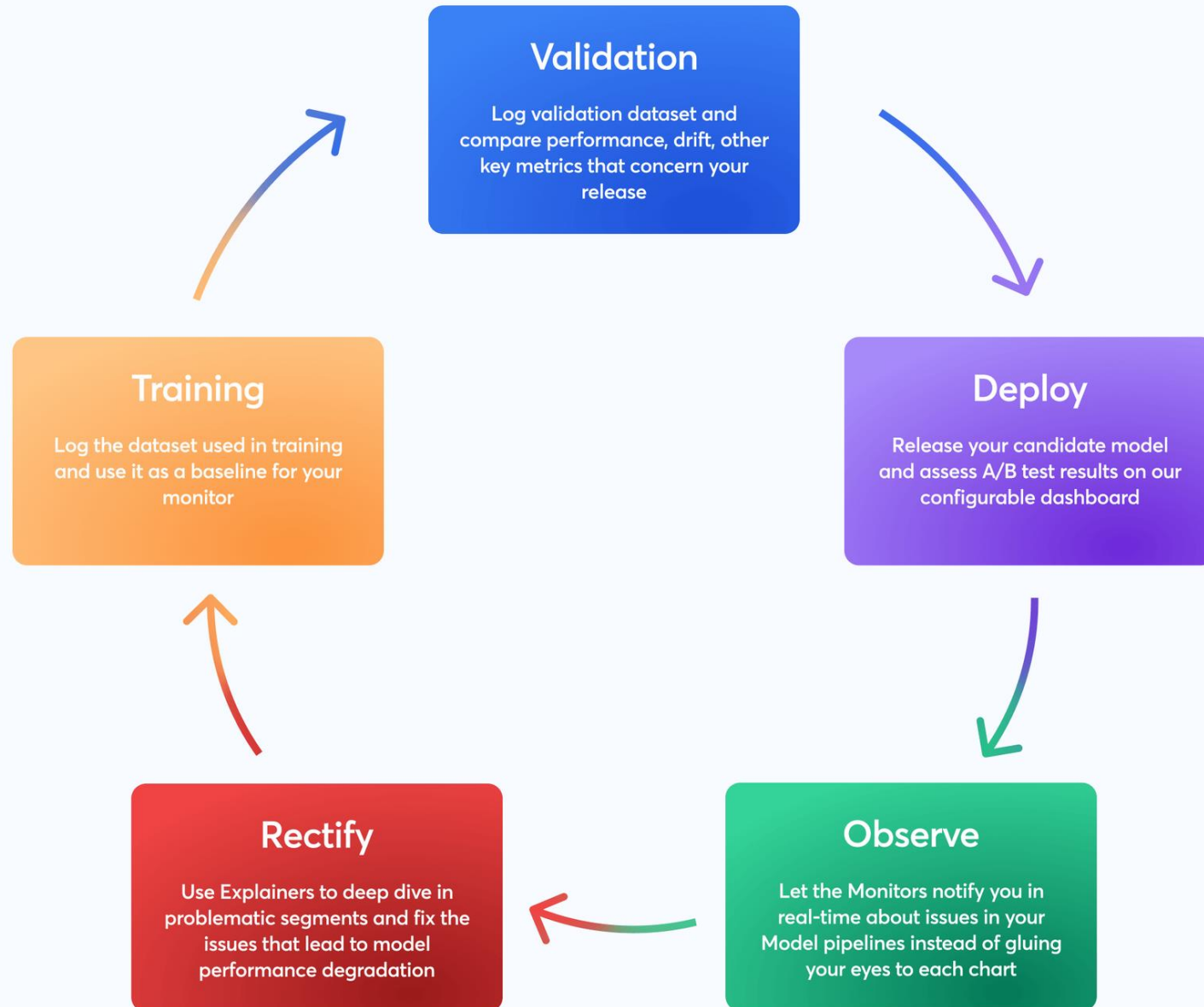
Interactions with
world

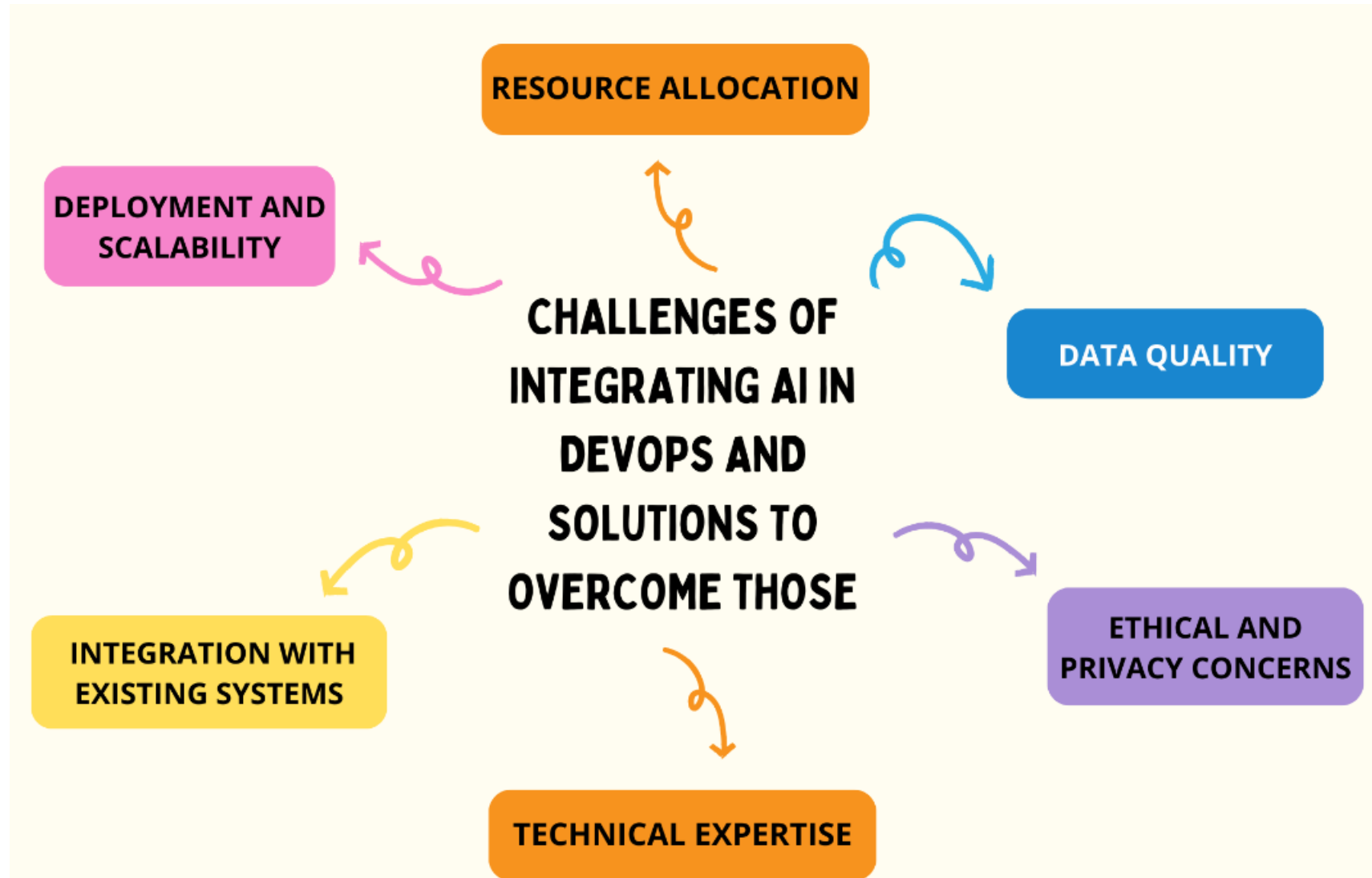
Examples

Table-level
lineage, column-
level lineage,
value-level
lineage

Examples

Queries against
table, fetches of
dashboard,
source-to-target
replication





Limitations of AI for DevOps



Implementation Costs



Stringent Data Privacy Laws



Out of Date Information



Suboptimal Solutions



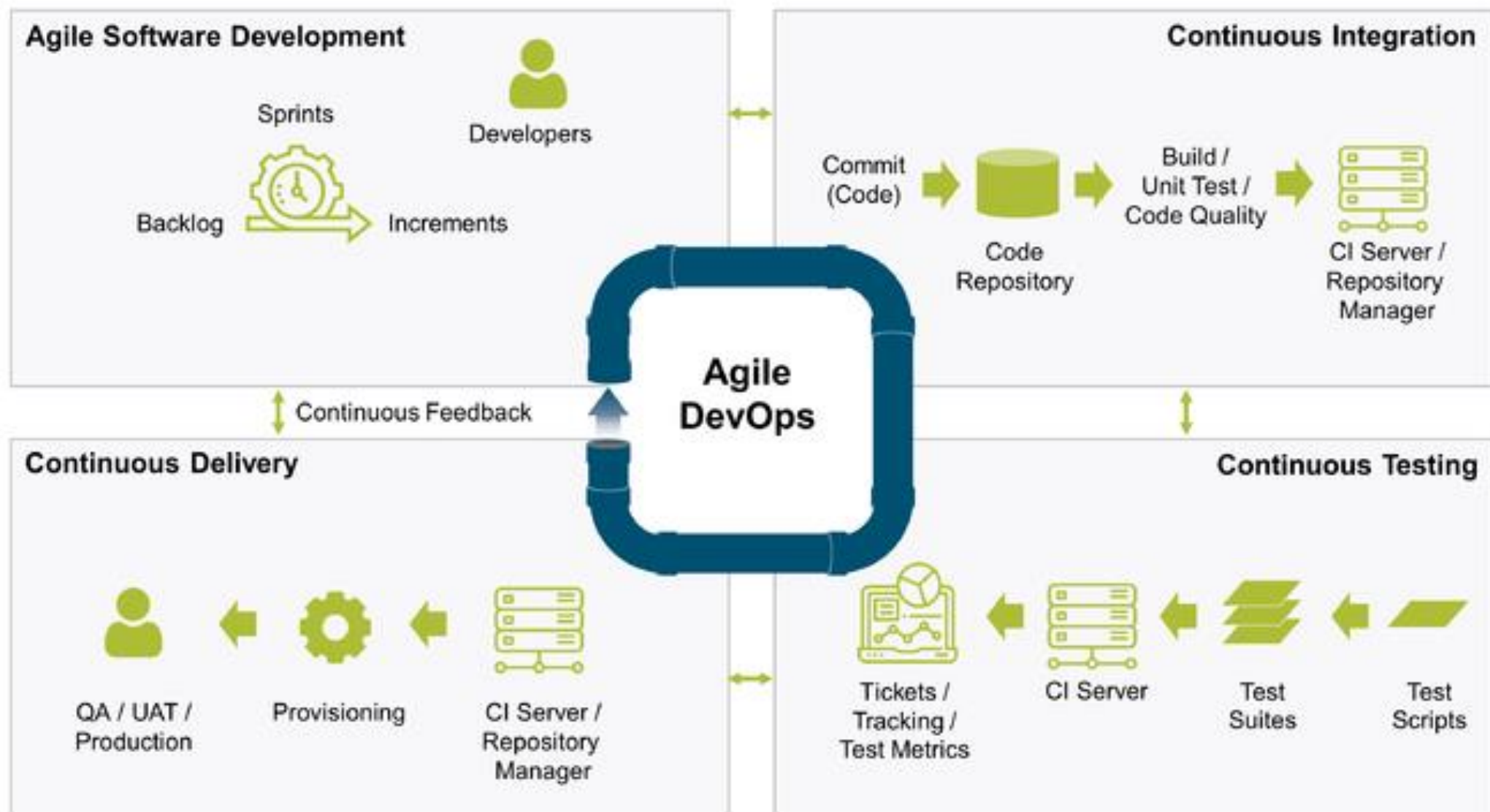
Human Supervision Necessary

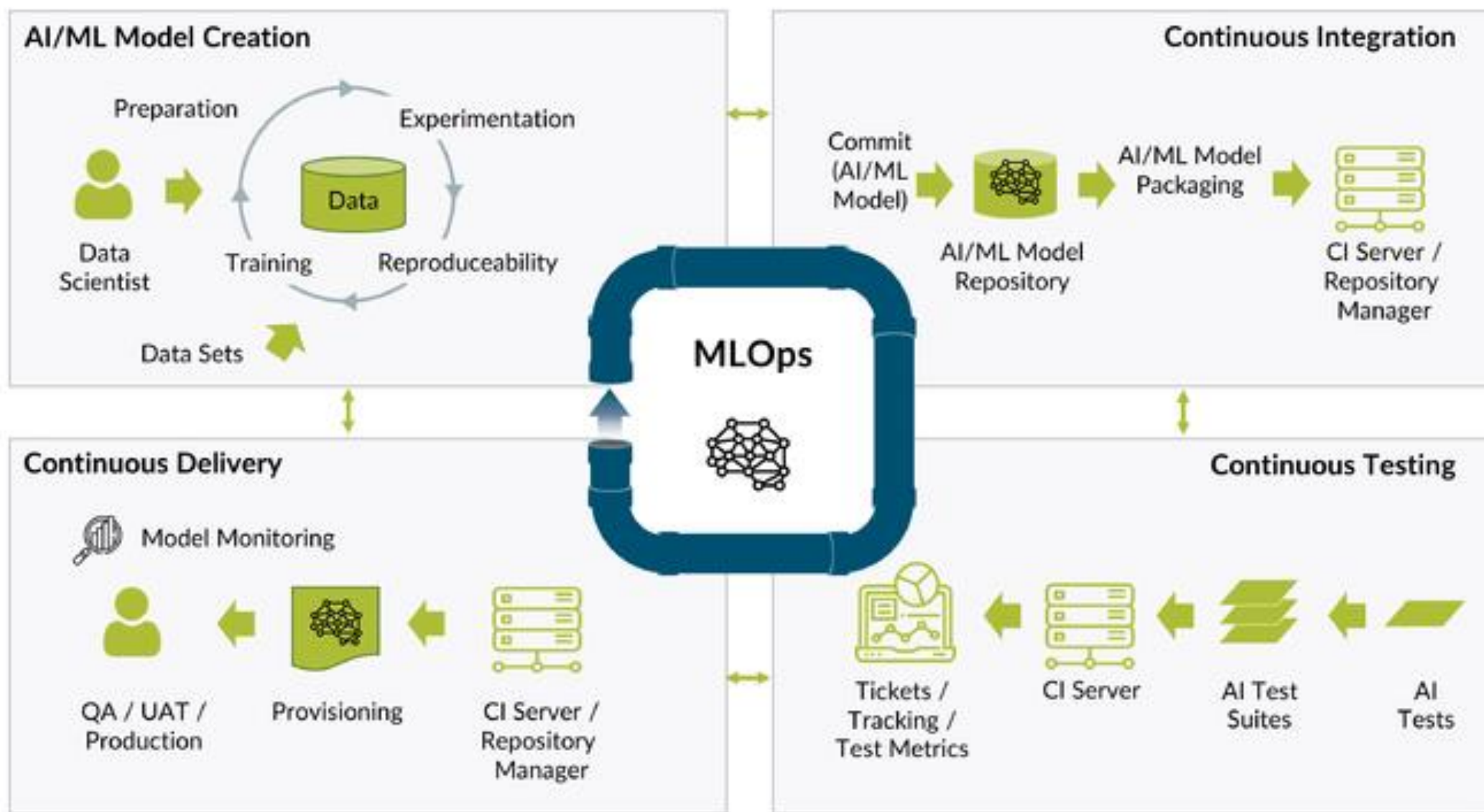


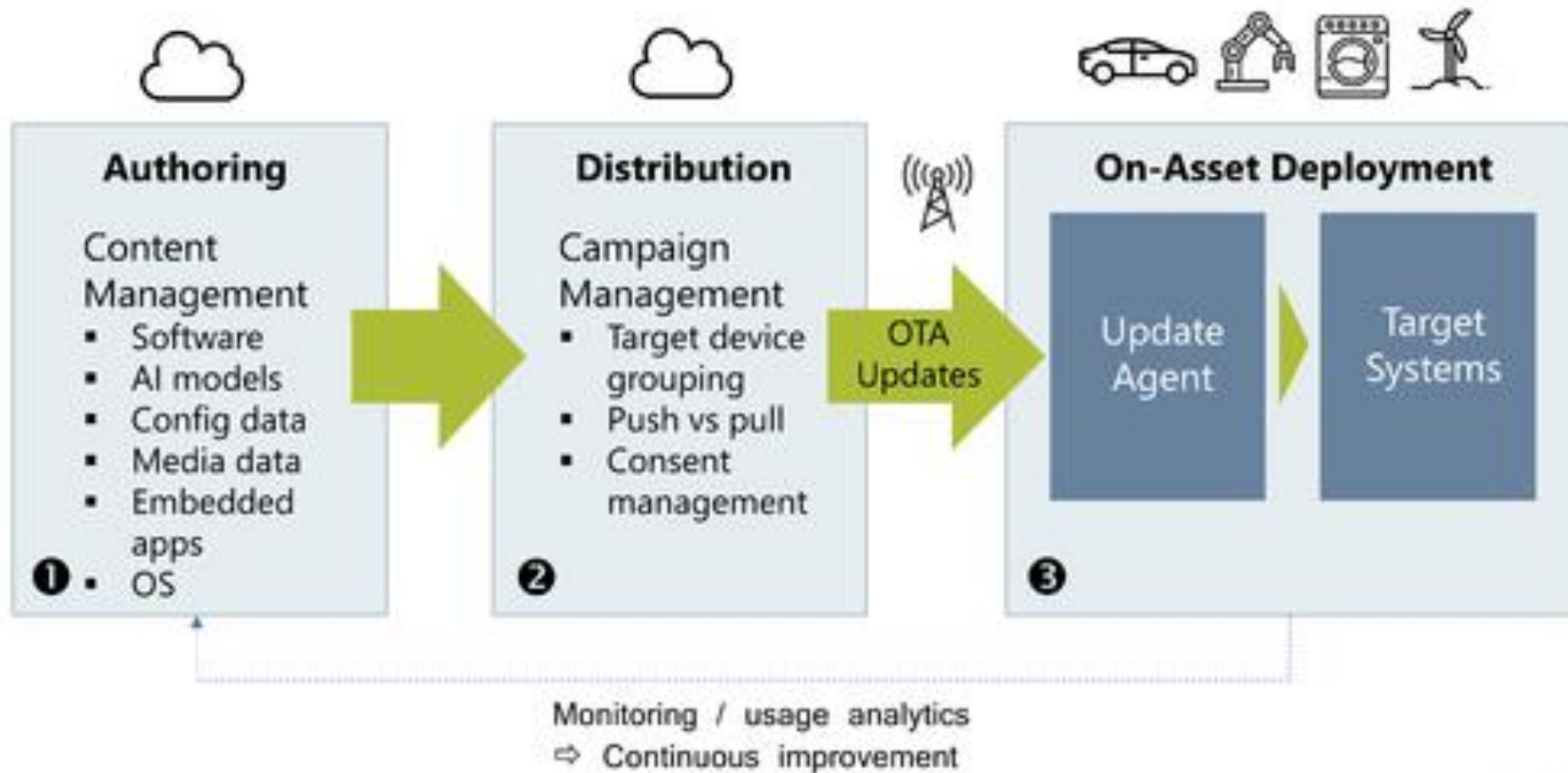
Not Immune to Biases

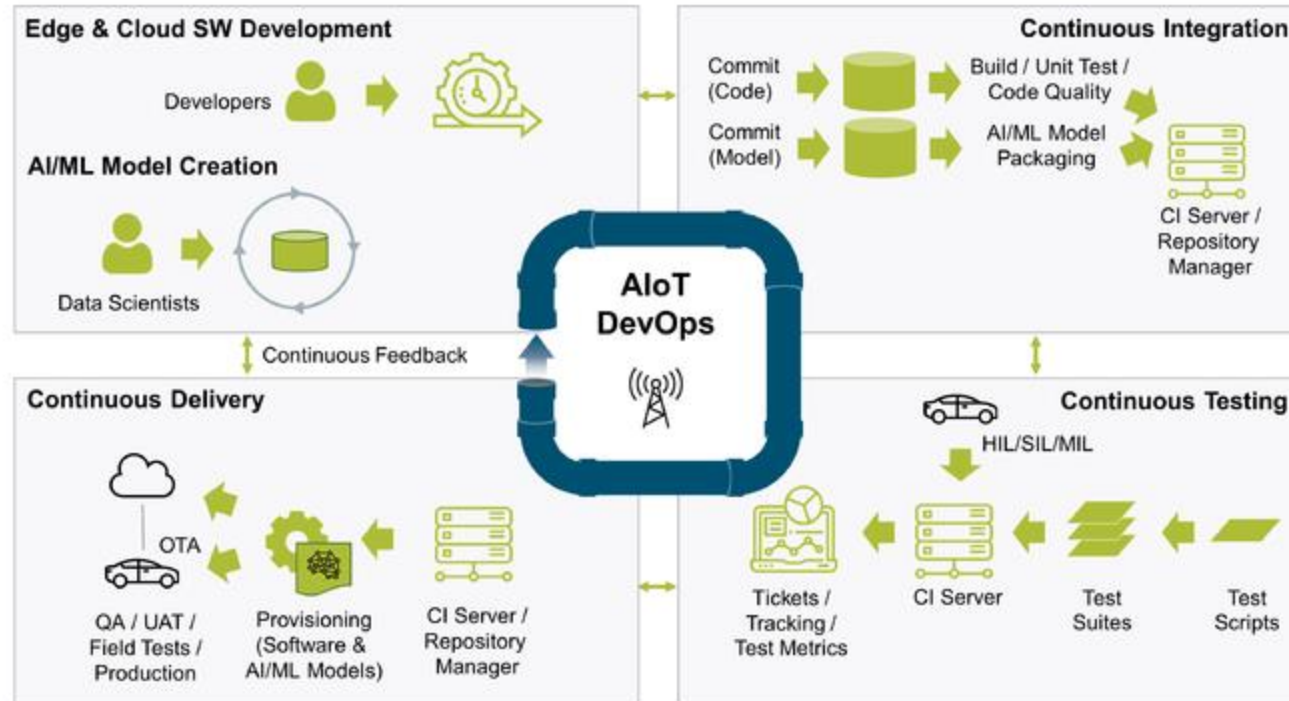


Need for Continuous Improvements









Tools For **Implementing AI In DevOps**

1 - ChatBots & Virtual Assistants

2 - Cloud-Based AI Programs

3 - Machine Learning Tools & Frameworks

4 - CI/CD/IaC Tools

5 - Natural Language Processing (NLP) Tools

top 15 AI tools for DevOps teams

1.Amazon CodeGuru

2.Datadog

3.Sysdig

4.GitLab

5.Weights & Biases

6.Prefect

7.Metaflow

8.Kedro

9.Pachyderm

10.DVC (Data Version Control)

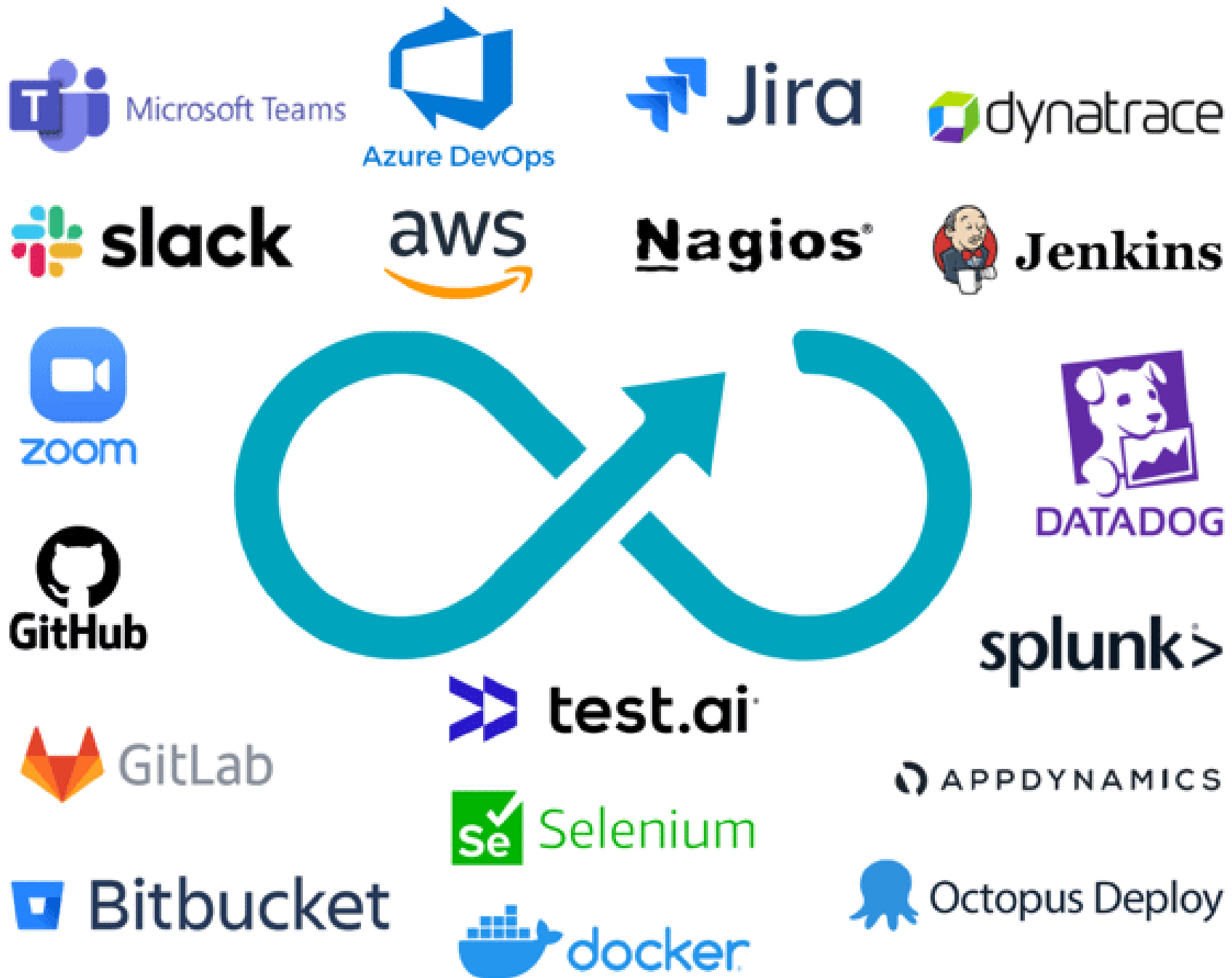
11.Splunk

12.New Relic

13.Dynatrace

14.Harness

15.IBM Watson AIOps



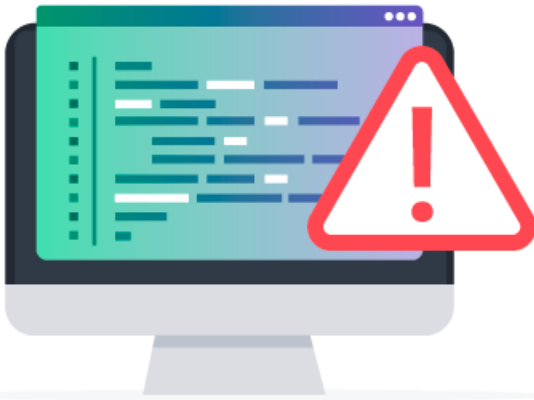
Top AI Tools for DevOps



AI-driven code review and analysis tools



Intelligent test automation tools



Anomaly detection and monitoring



Deployment optimization

Adding intelligence to developer operations

Empowering developer expertise with AI for DevOps



**Amazon
DevOps Guru**



Amazon DevOps Guru



**Automatically detect and
resolve operational issues**



**Improve code quality through
continuous monitoring**

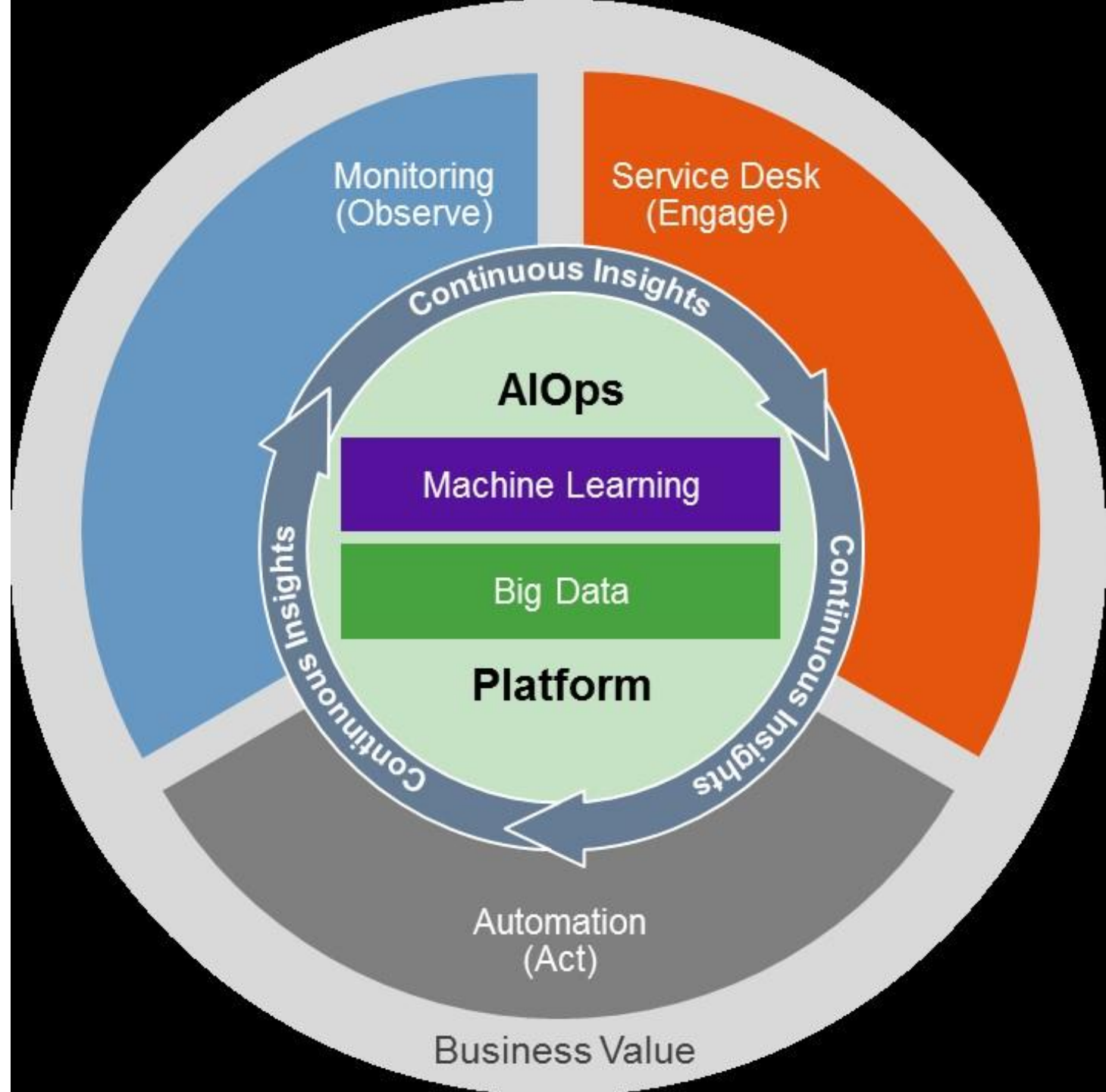


**Optimize application
performance and reduce costs**

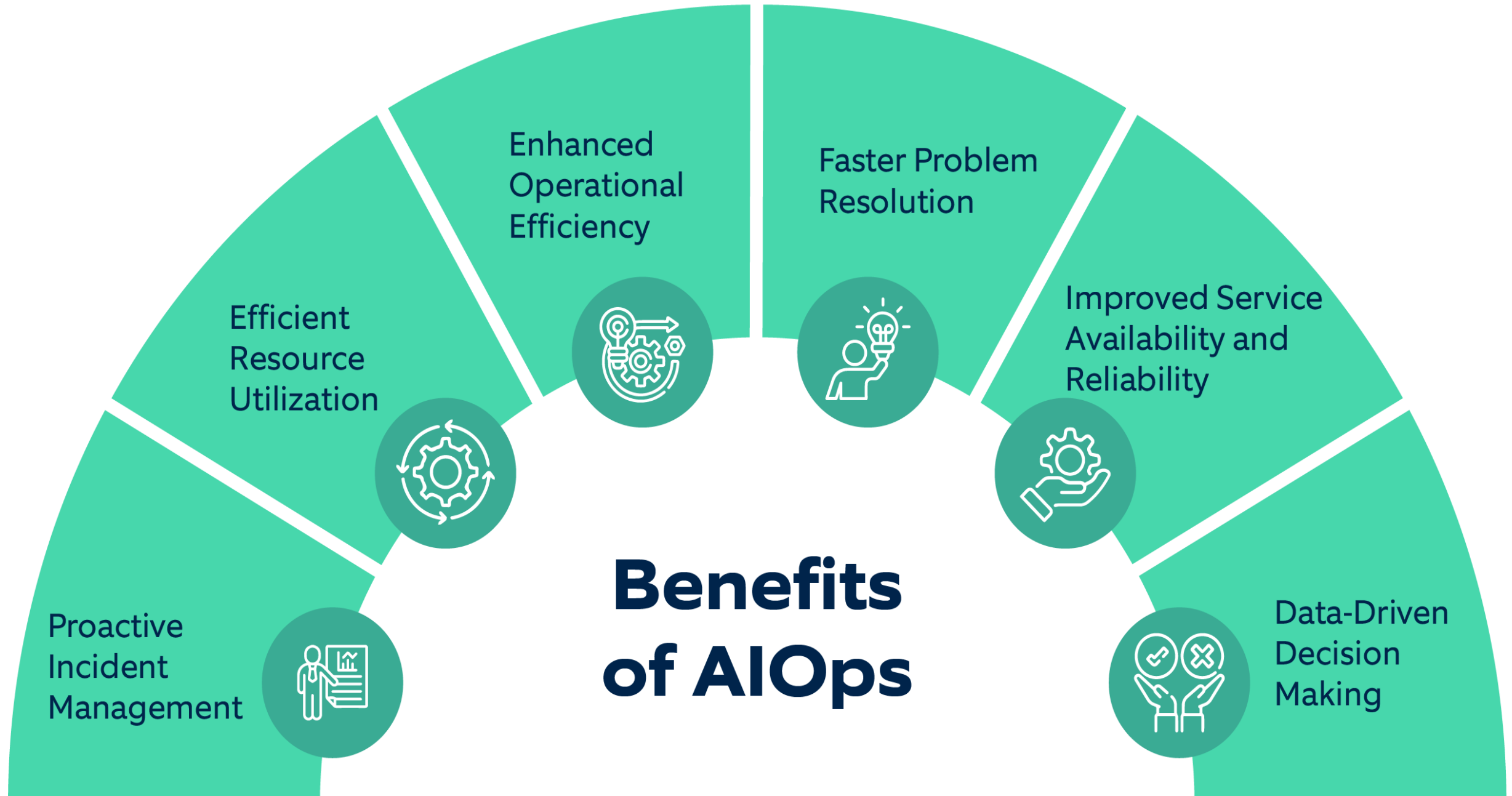


Security at scale

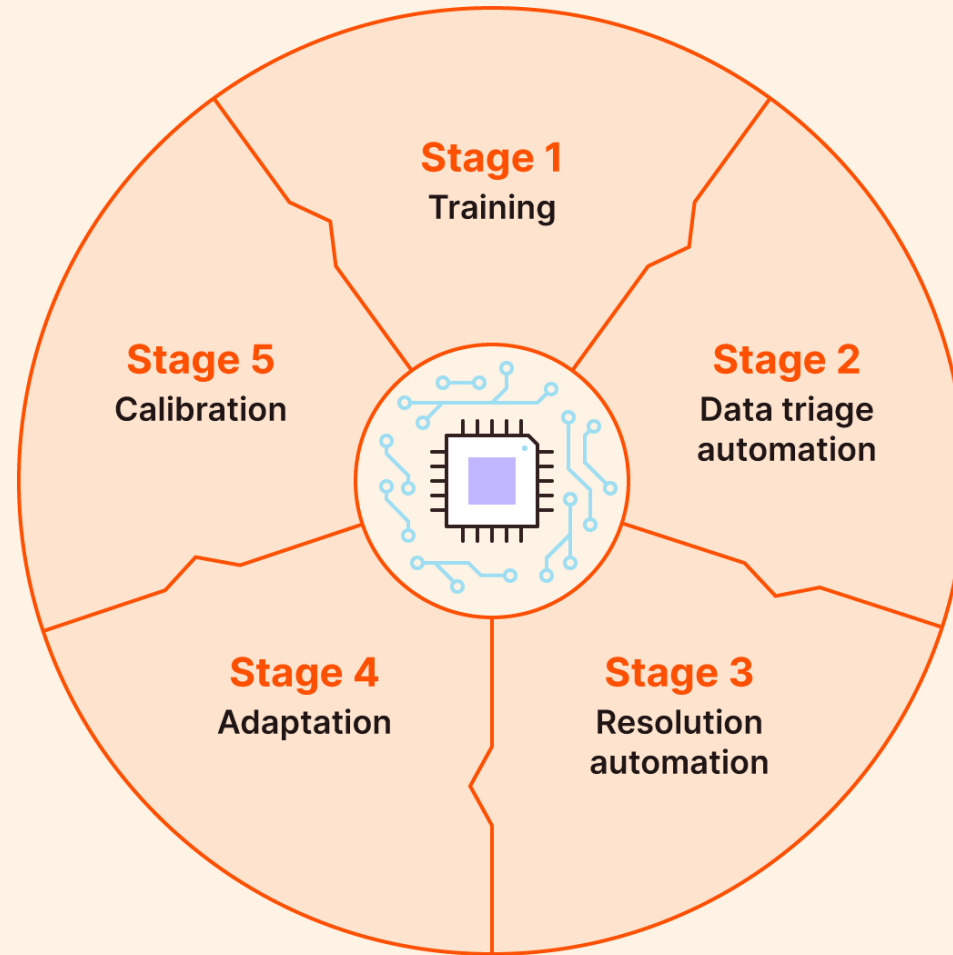
What is AiOps?



Benefits of AIOps

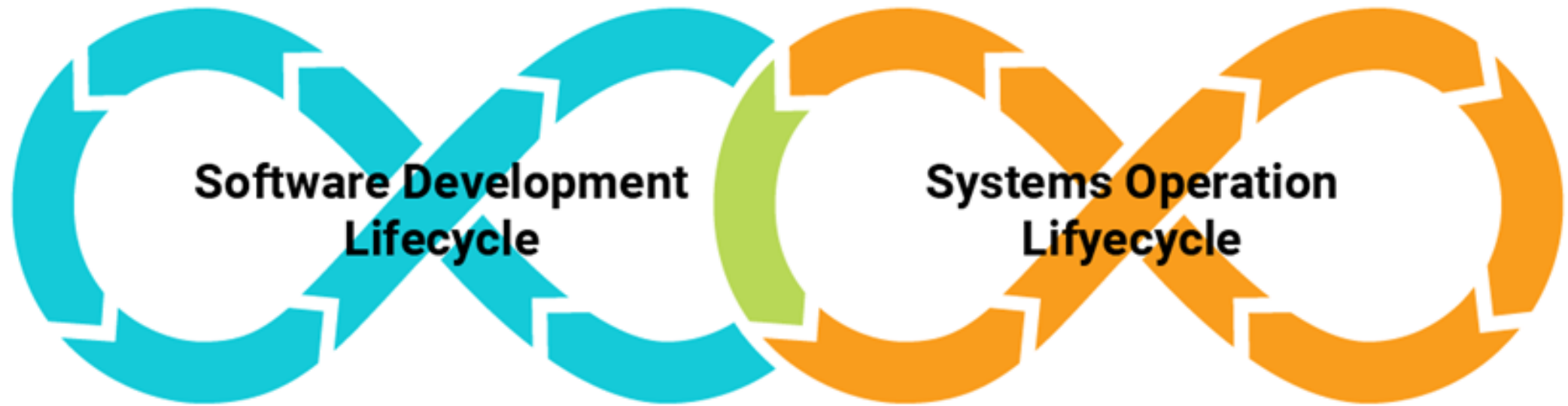


AI Ops stages



DevOps

AIOps



Key Benefits of Integrating AIOps with DevOps

Key Benefits of Integrating AIOps with DevOps

Enhanced Automation:

- 1. AIOps:** Uses machine learning and data analytics to automate routine tasks, such as monitoring, alerting, and incident response.
- 2. DevOps:** Automates the software development lifecycle, from code integration to deployment and testing.
- 3. Combined:** This leads to end-to-end automation, reducing manual intervention, accelerating delivery cycles, and minimizing human error.

Key Benefits of Integrating AIOps with DevOps

Proactive Issue Resolution:

- **AIOps:** Predicts potential issues before they occur by analyzing historical data and detecting patterns.
- **DevOps:** Facilitates continuous monitoring and rapid feedback loops.
- **Combined:** Enables proactive issue detection and resolution, reducing downtime and improving system reliability.

Key Benefits of Integrating AIOps with DevOps

Improved Collaboration:

- **AIOps:** Provides insights and analytics that can be shared across teams.
- **DevOps:** Emphasizes collaboration between development and operations teams.
- **Combined:** Fosters a culture of collaboration and shared responsibility, enhancing communication and coordination.

Key Benefits of Integrating AIOps with DevOps

Data-Driven Decision Making:

- **AIOps:** Analyzes vast amounts of data to provide actionable insights and recommendations.
- **DevOps:** Uses metrics and KPIs to drive improvements in the development process.
- **Combined:** Empowers teams with data-driven insights to make informed decisions, optimize performance, and improve quality.

Key Benefits of Integrating AIOps with DevOps

Scalability and Flexibility:

- **AIOps:** Scales operations by automating repetitive tasks and managing complex infrastructures.
- **DevOps:** Enables agile and flexible development practices.
- **Combined:** Ensures that both operations and development can scale efficiently to meet changing demands.

Use Cases of Integrating AIOps with DevOps

Use Cases of Integrating AIOps with DevOps

Incident Management:

- **AIOps:** Automatically detects and prioritizes incidents, reducing response times.
- **DevOps:** Streamlines the deployment of fixes and updates.
- **Combined:** Enhances incident management by quickly identifying root causes and deploying solutions.

Use Cases of Integrating AIOps with DevOps

Performance Optimization:

- **AIOps:** Monitors and analyzes performance metrics to identify bottlenecks.
- **DevOps:** Implements continuous performance testing and optimization.
- **Combined:** Ensures optimal performance through continuous monitoring and improvement.

Use Cases of Integrating AIOps with DevOps

Security and Compliance:

- **AIOps:** Identifies security threats and compliance issues using advanced analytics.
- **DevOps:** Integrates security practices into the development process (DevSecOps).
- **Combined:** Strengthens security and compliance by integrating AI-driven insights with secure development practices.

Certification Program for AiOps and DevOps

CERTIFICATION / COURSES NAME
DevOps Certified Professional (DCP)
DevSecOps Certified Professional (DSOCP)
Site Reliability Engineering (SRE) Certified Professional
Master in DevOps Engineering (MDE)
Master in Azure DevOps
MLOps Certified Professional (MLOCP)
AiOps Certified Professional (AIOCP)
DataOps Certified Professional (DOCP)
Kubernetes Certified Administrator & Developer (KCAD)

<https://www.devopsschool.com/certification/>

*Thank
you!*

Email - DevOps@ **RajeshKumar**.xyz