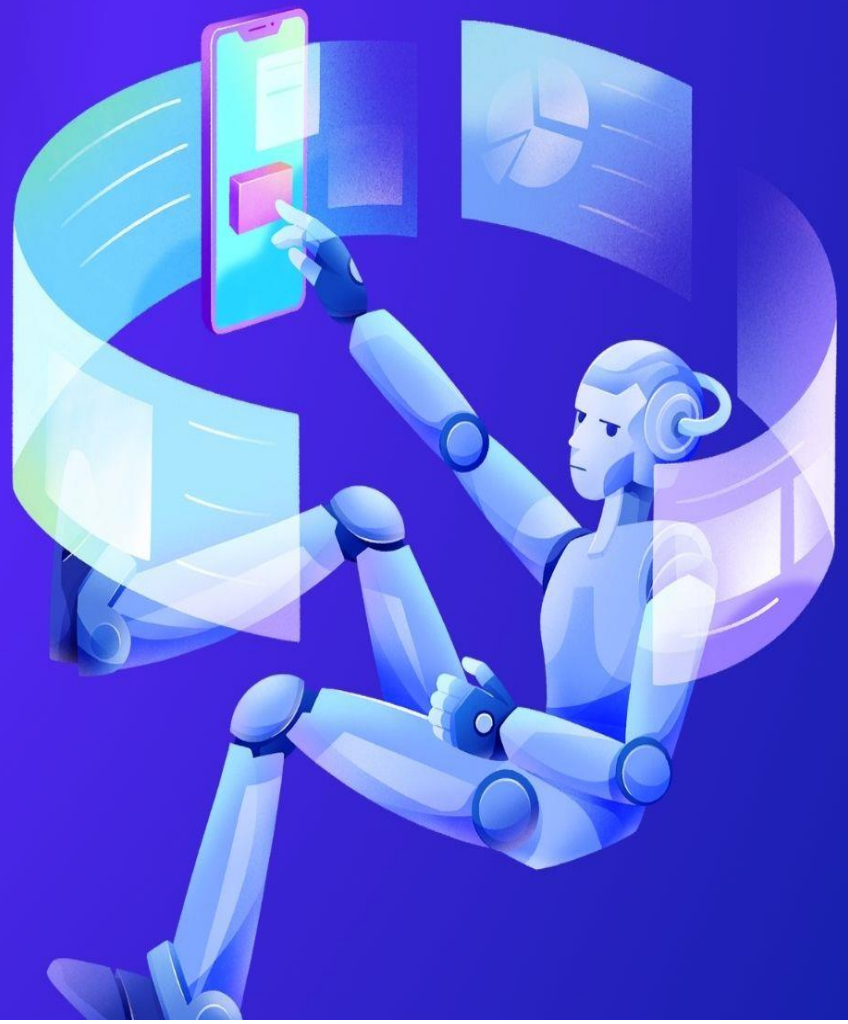
MLOPS



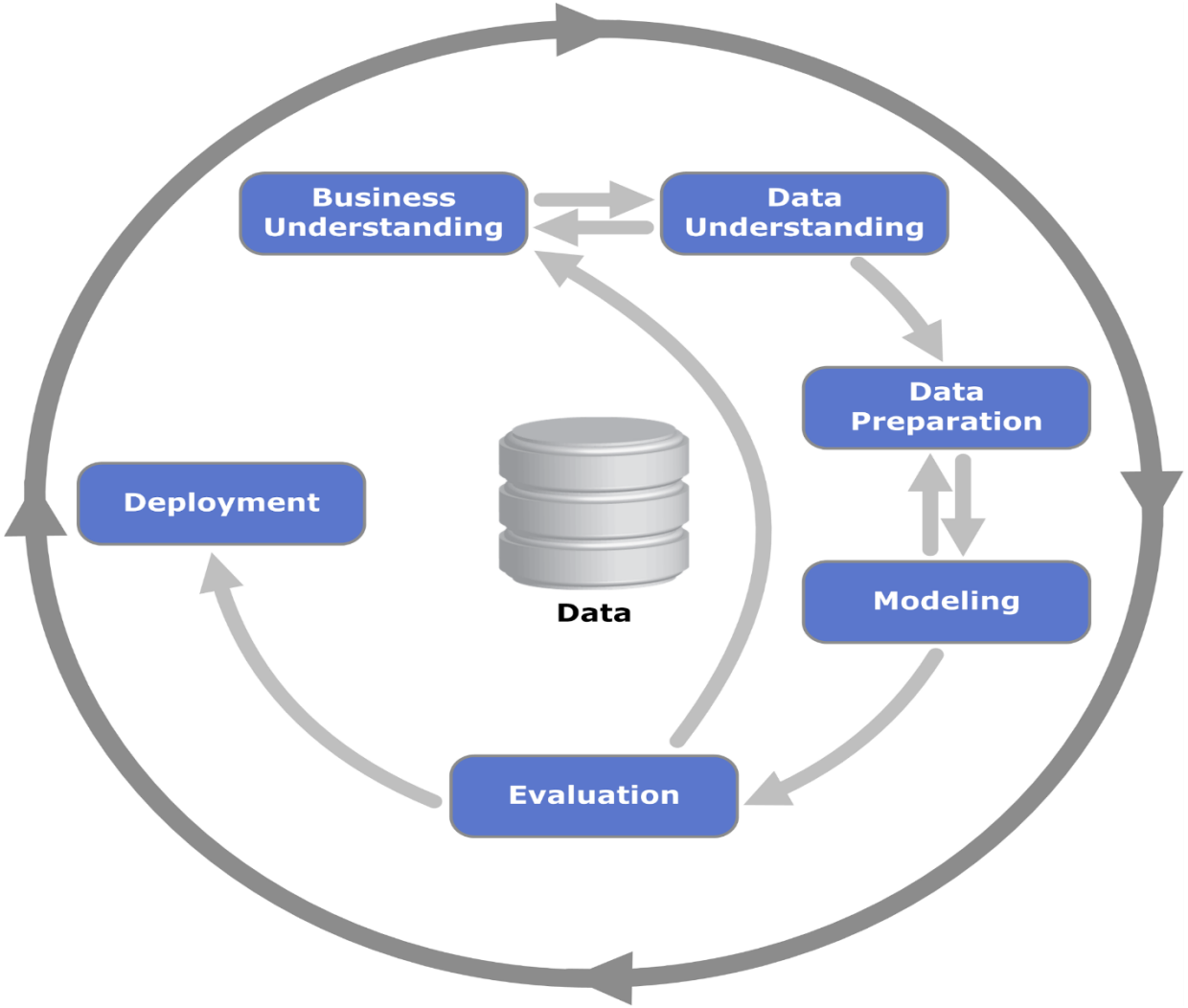
MLOps

Agenda

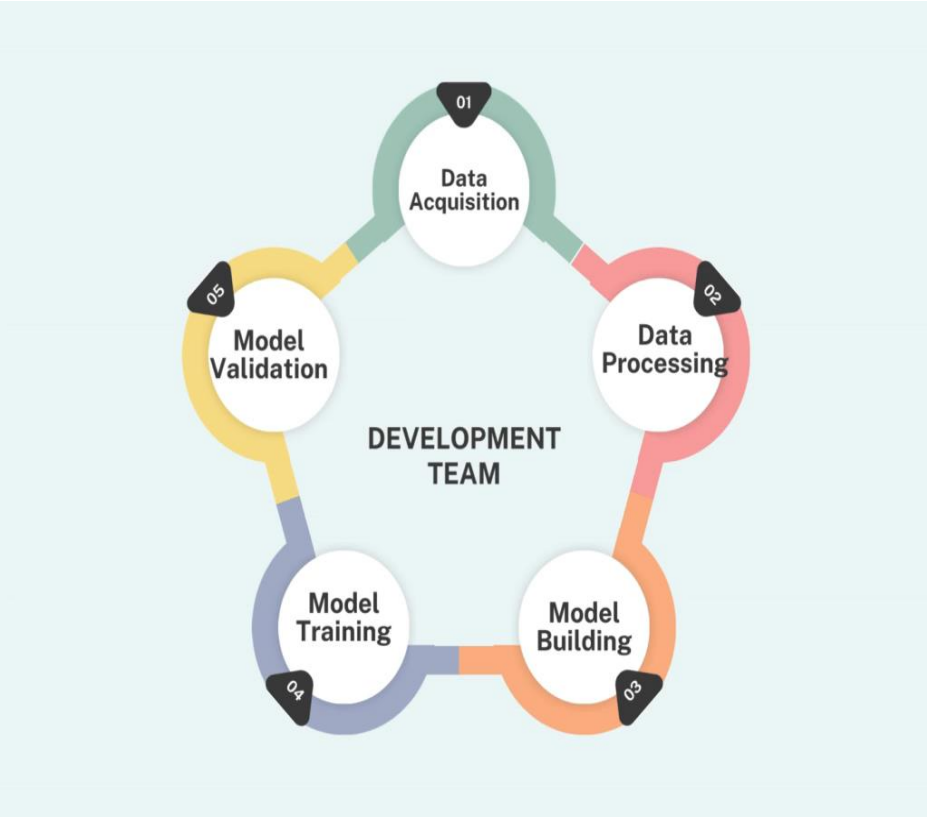
Agenda

- **ML Lifecycle**
- ***Challenges in ML Lifecycle***
- ***What is MLOps***
- ***MLOps Vs DevOps***
- ***What is Not Mlops***
- ***Key Components of MLOps***
- **Tools and Techniques for MLOps**

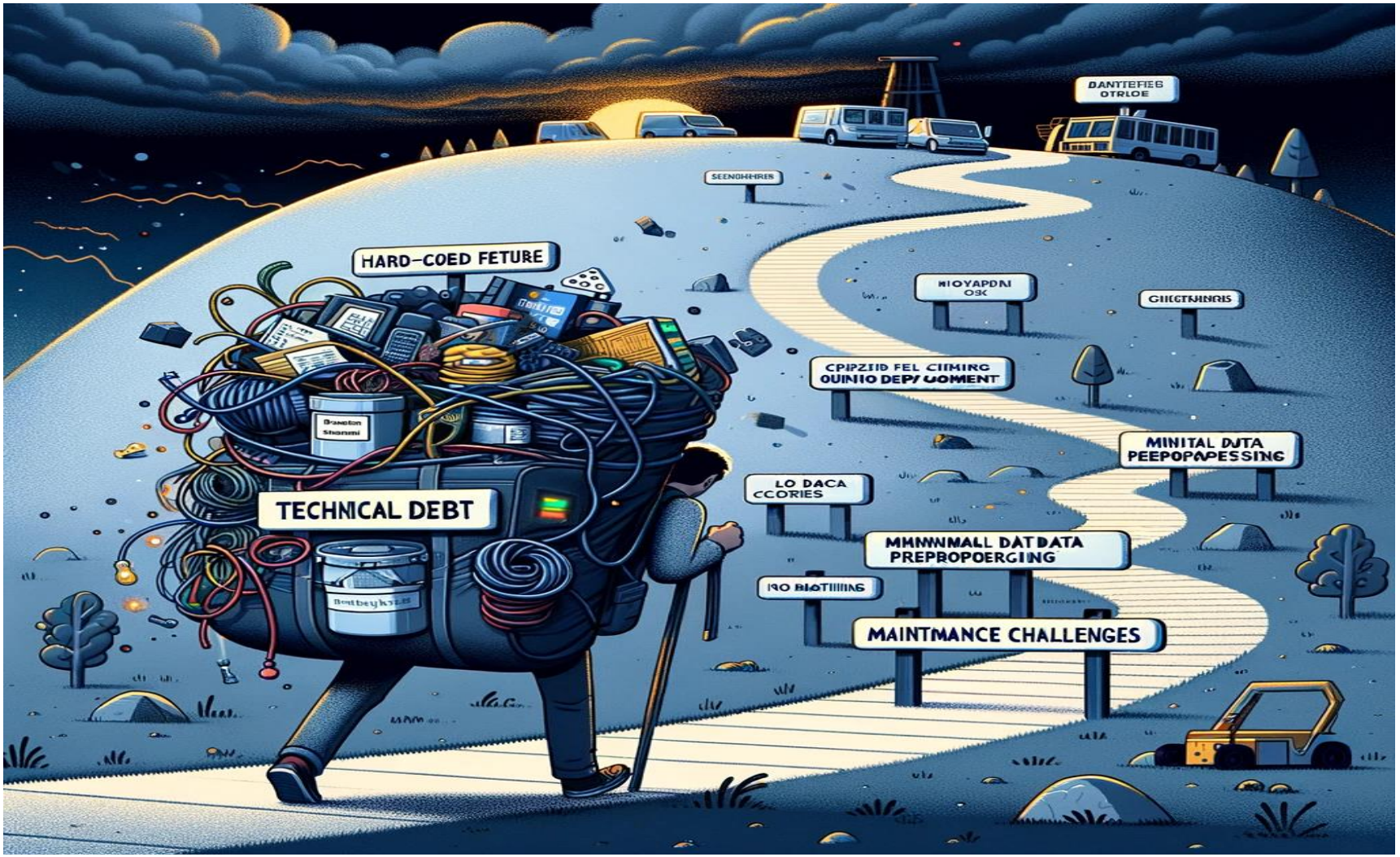
ML Lifecycle



ML Lifecycle



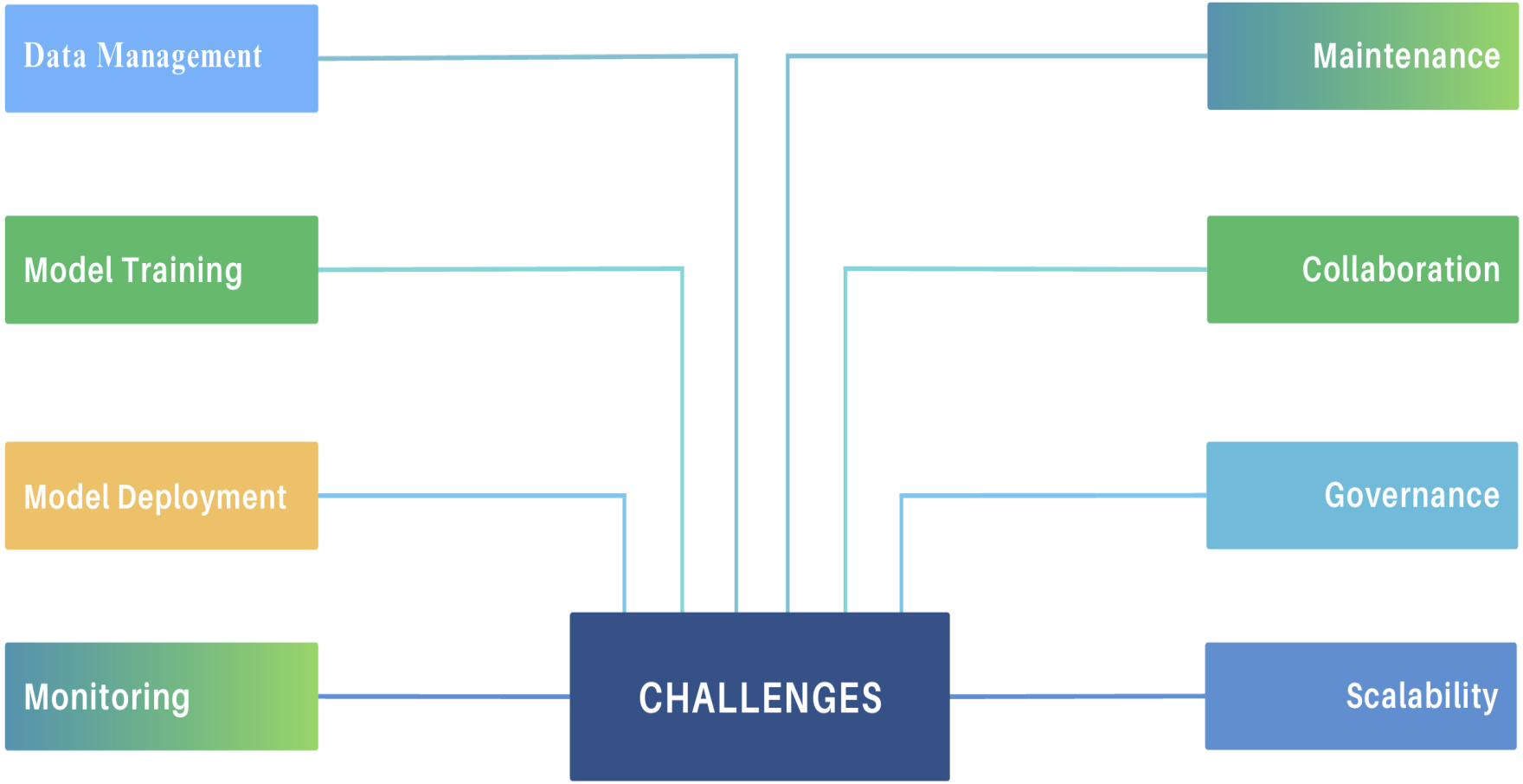
Technical Debt in Machine Learning



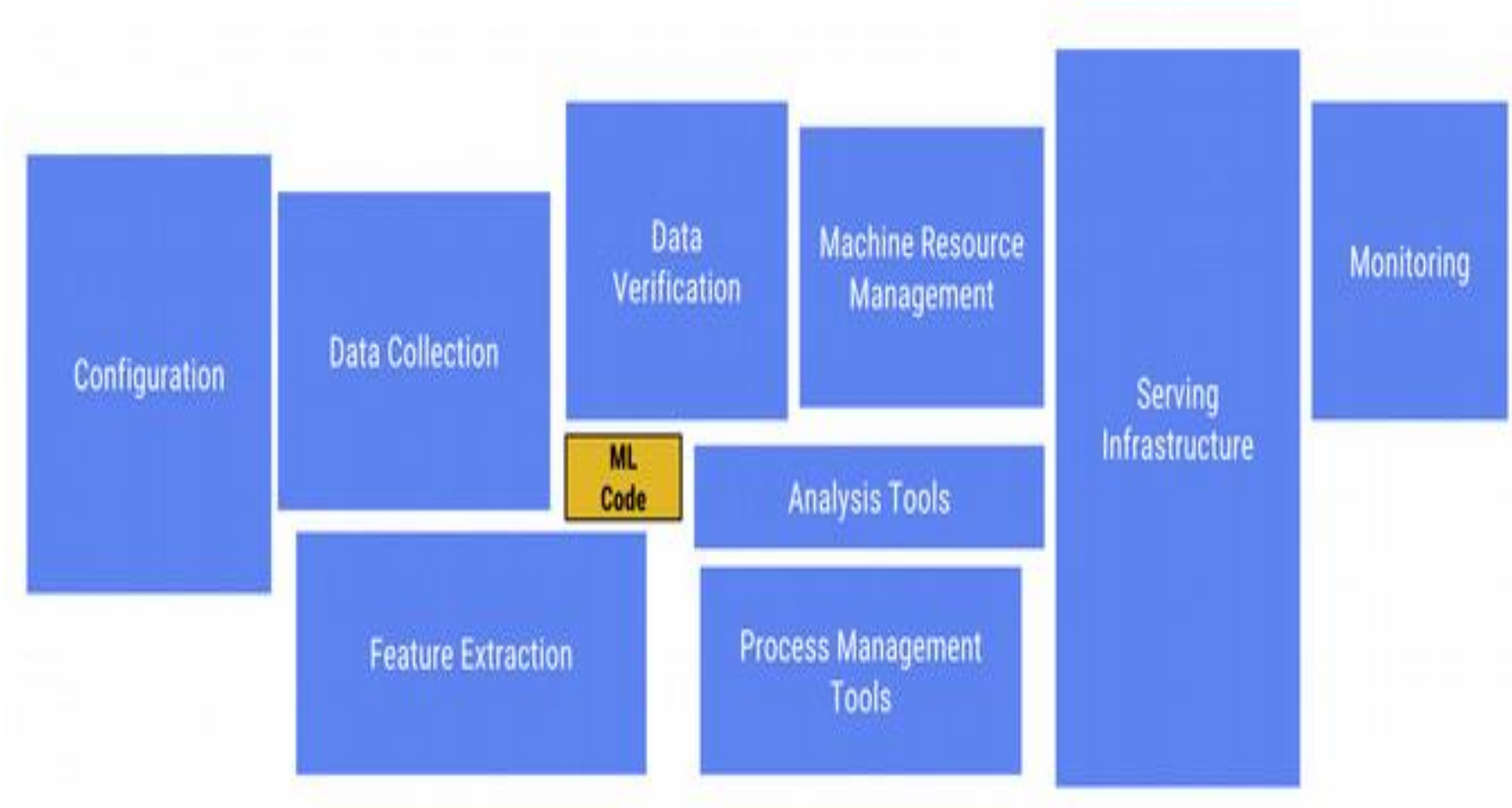
TECHNICAL DEBT

1. Hard-coded Features
2. Minimal Data Preprocessing
3. Lack of Monitoring
4. No Version Control

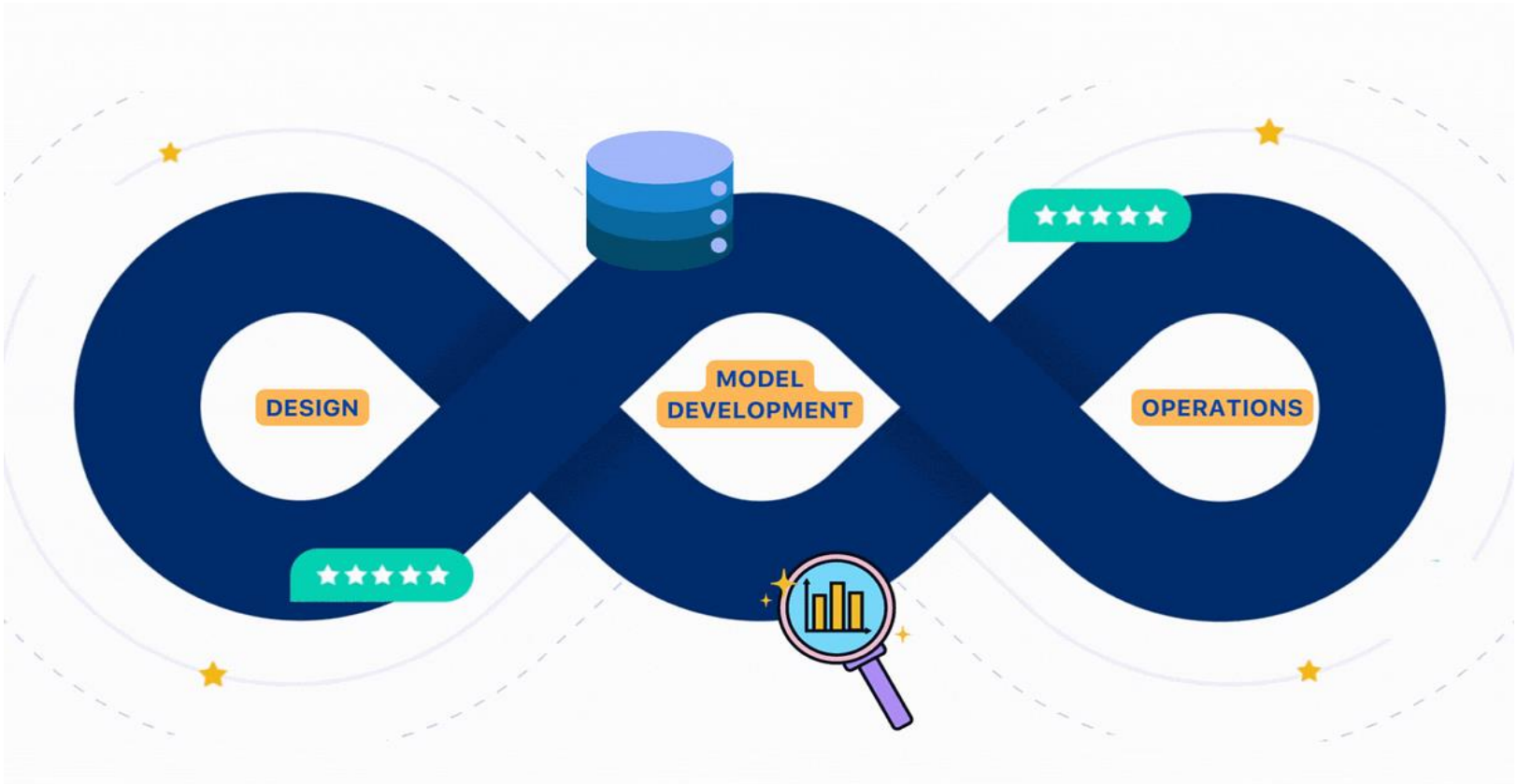
Challenges in ML Lifecycle



ML System Components



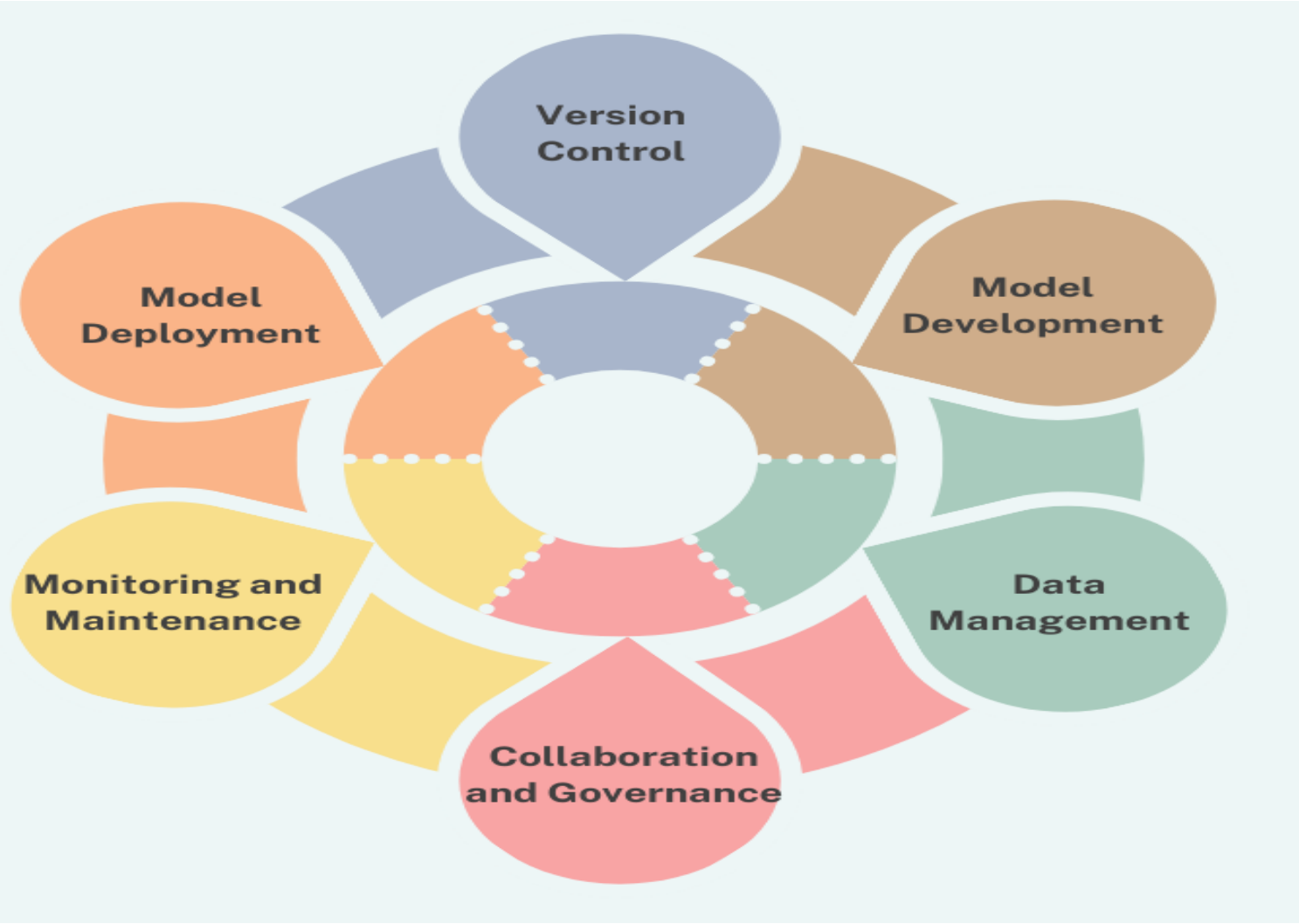
MLOPS



At the core of MLOps is the ongoing enhancement of all business activities

Concept of Kaizen

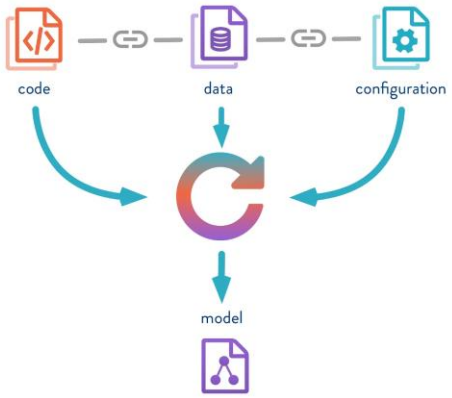
Key Components of MLOps



Overcoming Machine Learning Lifecycle Challenges with MLOps

1. Data Management Challenges
2. Model Training and Experimentation Challenges
3. Model Deployment Challenges
4. Monitoring and Maintenance Challenges
5. Collaboration and Governance Challenges
6. Reproducibility and Consistency Challenges
7. Scalability Challenges

Tools and Techniques for MLOps



Tools and Techniques for MLOps

Tool / Platform	Purpose
Git	Version control for code.
DVC (Data Version Control)	Version control for datasets.
MLflow	Model versioning and managing the ML lifecycle.
Docker	Containerization of ML models and environments.
Kubernetes	Orchestration of containerized applications.
Jenkins / GitLab CI	Automating the testing and deployment of ML models.
Prometheus / Grafana	Monitoring model performance and tracking data drift.
Apache Airflow	Orchestrating and scheduling complex ML workflows.
Kubeflow	Managing and deploying ML workflows on Kubernetes.
Weights & Biases	Experiment tracking and management.
AWS / Google Cloud / Azure	Cloud-based services for ML operations and hosting.

ML-based solution