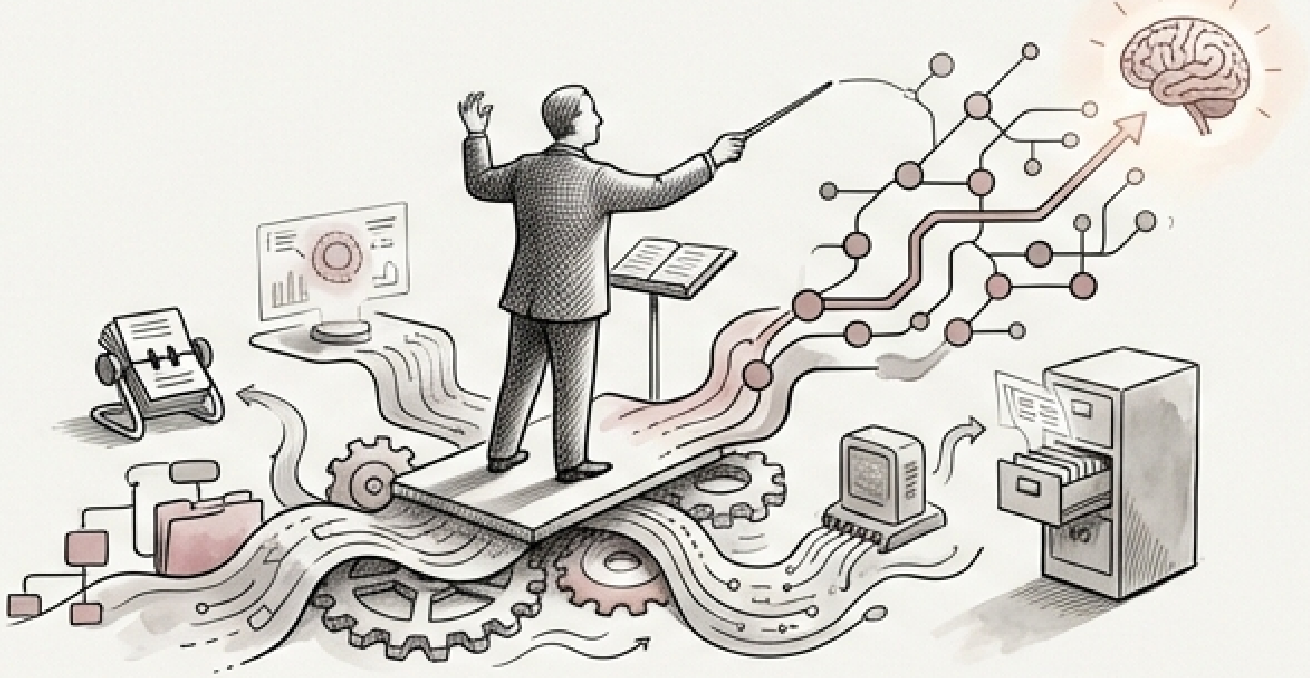
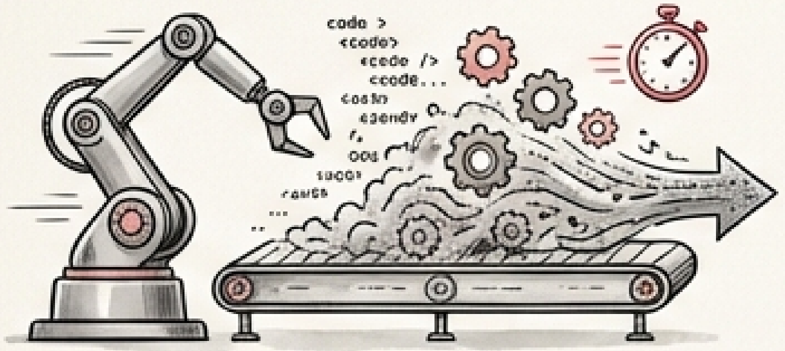
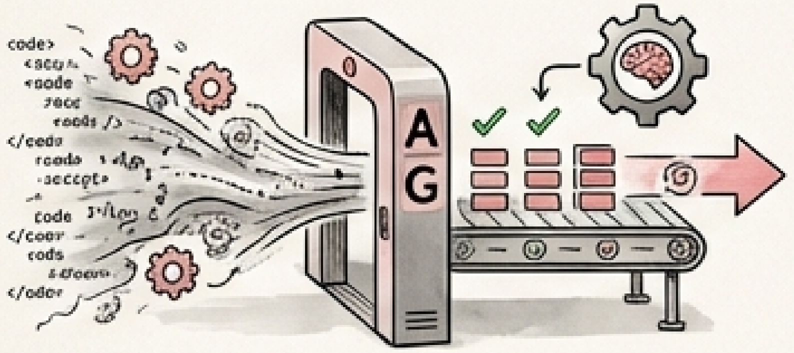
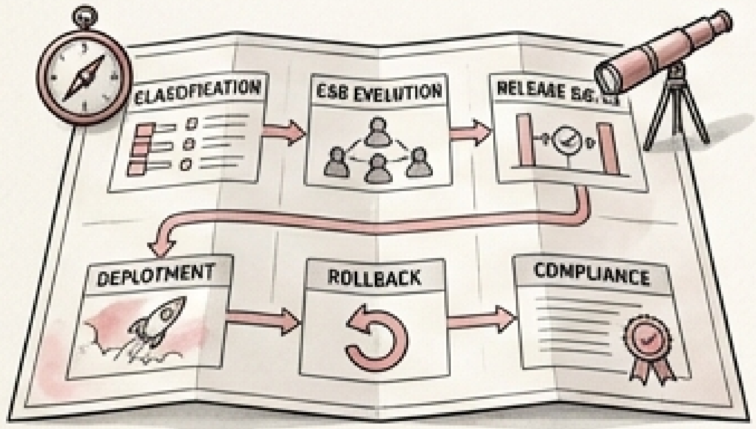


Modernizing Change Management for AI-Augmented Development

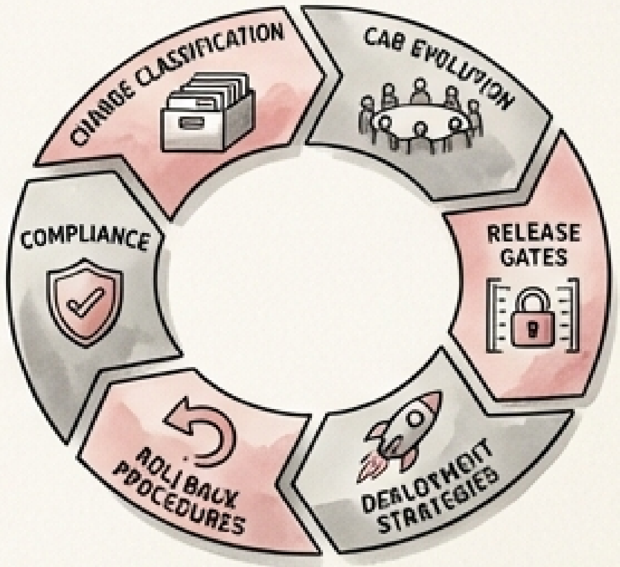
Modernizing Change Management for AI-Augmented Development





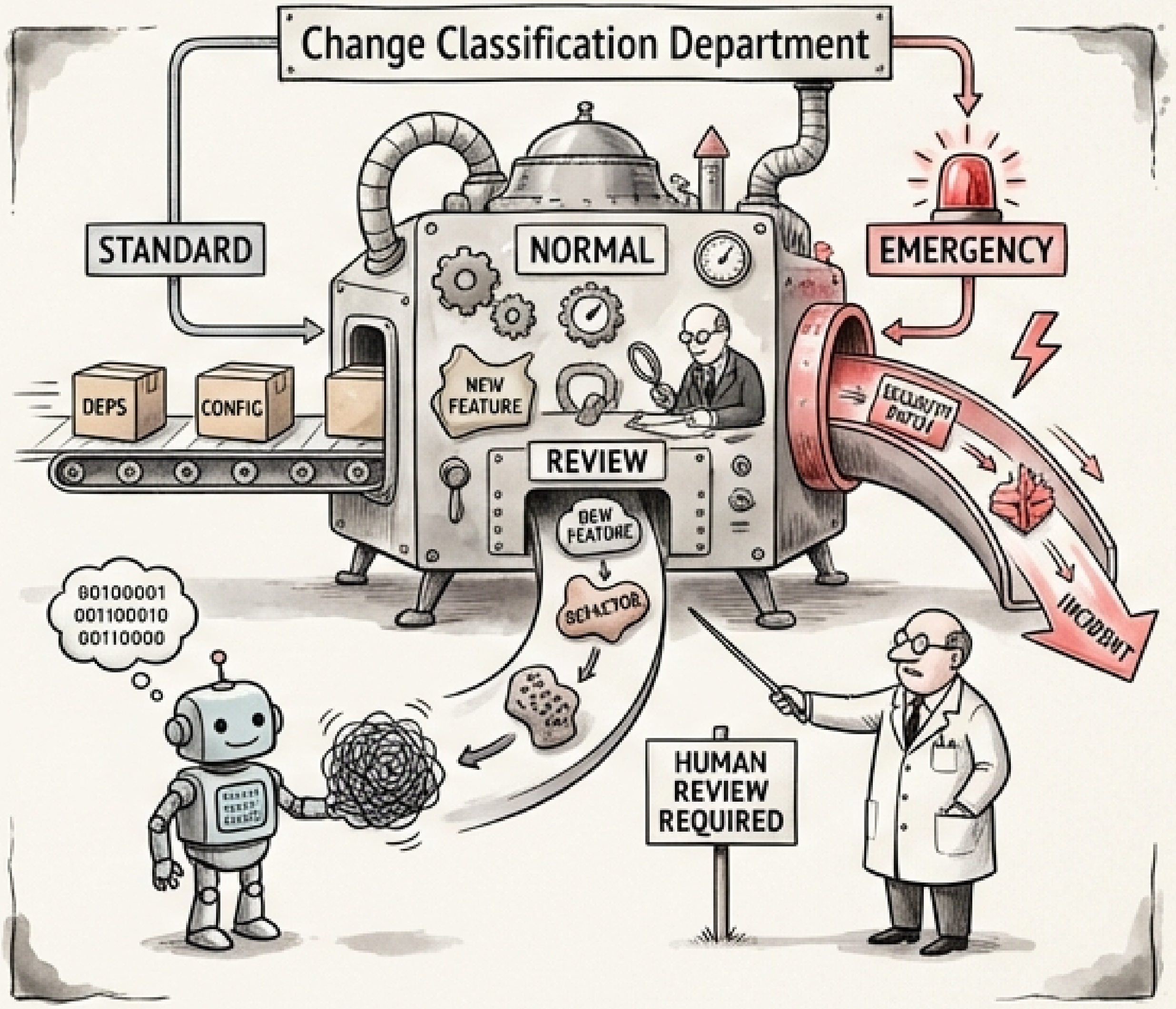


- AI-augmented development dramatically increases the volume and velocity of code changes.
- Traditional **manual change management** processes become **bottlenecks** in fast-paced AI projects.
- **Automated governance** is essential for managing the increased change frequency effectively.
- This presentation outlines strategies for **governing releases** in AI-augmented development environments.
- We will explore **change classification, CAB evolution**, release gates, deployment strategies, **rollback procedures** and **compliance**.



Change Classification: Balancing Speed and Safety

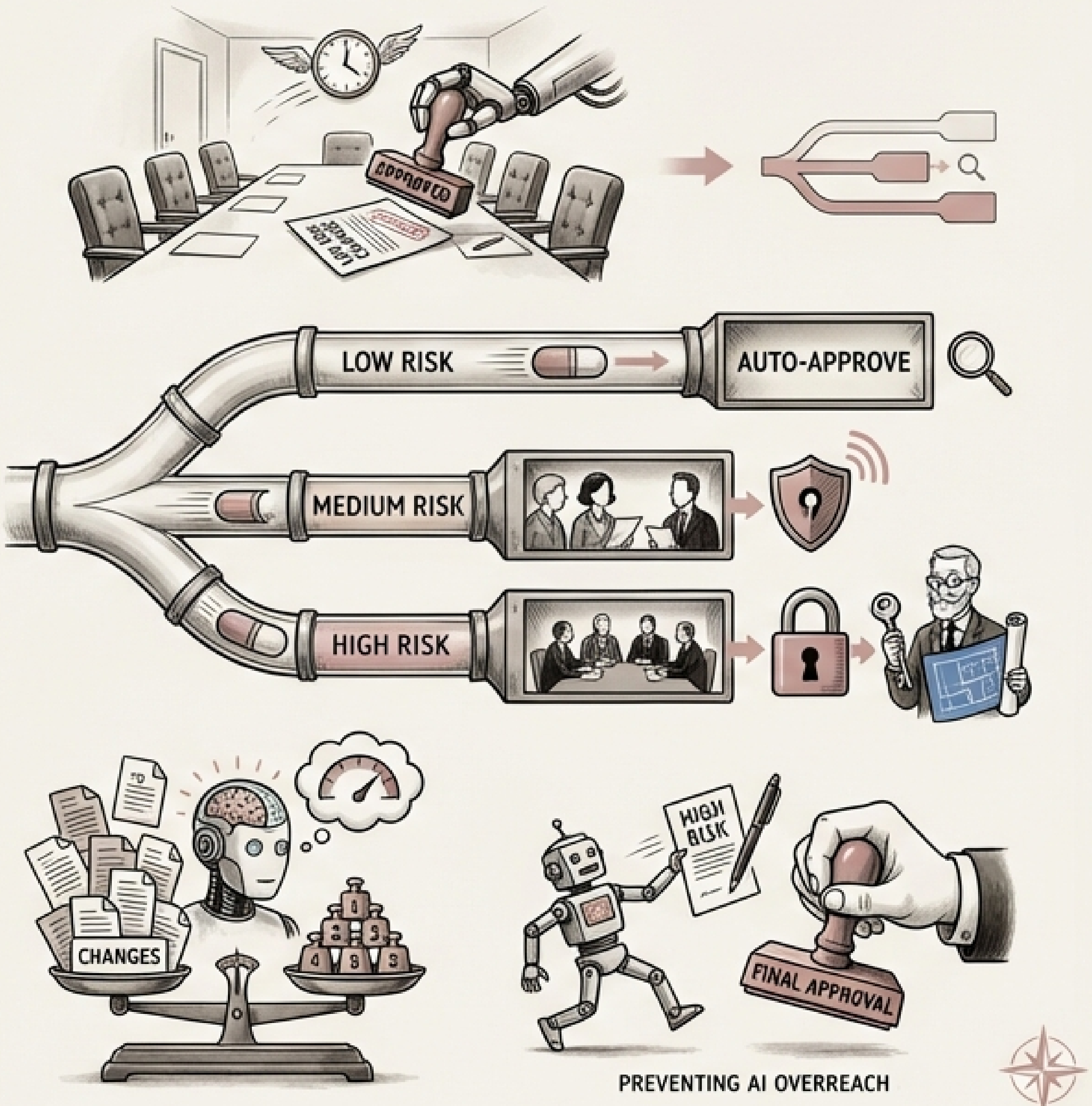
- **STANDARD CHANGES:** Pre-approved, low-risk, routine tasks like dependency updates and configuration changes.
- **NORMAL CHANGES:** Require review and approval due to moderate risk, encompassing new features and refactoring.
- **EMERGENCY CHANGES:** Expedited approval for high-urgency issues such as security patches and incident response.
- **AI-GENERATED CHANGES:** Automatically classified as normal changes, requiring human review before deployment.
- **RATIONALE:** Avoid auto-approving AI-produced code as standard changes to prevent unexpected issues.



The Balancing Act: Speed, Safety, and the Human Element in Change Management

Evolving the CAB: **Lightweight Approval Through Risk Scoring**

- Lightweight CAB: Automated risk scoring replaces manual meetings for low-risk changes, increasing efficiency.
- Risk-Based Routing: Automates workflow based on risk: low risk → auto-approve with audit trail.
- Risk-Based Routing: medium risk → peer review + security scan; high risk → CAB review + security architect approval.
- AI-Generated Risk Assessments: Triage changes and provide initial risk scores for faster decision-making.
- Human Oversight: Humans retain final approval authority, especially on high-risk items, preventing AI overreach.



Release Gates: Ensuring Quality at Every Stage

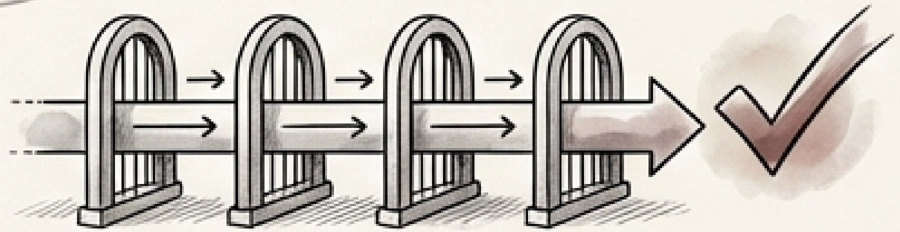
Gate 1 (Code): All tests pass, SAST clean (no critical/high vulnerabilities), SCA clean, code review approved, AI provenance tagged.

Gate 2 (Build): Artifact integrity verified, SBOM generated, container scan clean, dependency audit clean.

Gate 3 (Deploy): Environment configuration validated, rollback plan documented, monitoring alerts configured, change ticket approved.

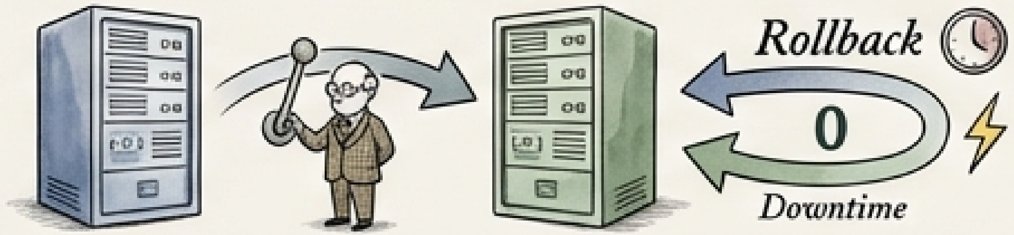
Gate 4 (Post-deploy): Smoke tests pass, error rates normal, performance baseline met, security monitoring active.

Each gate acts as a checkpoint to verify quality and security throughout the CI/CD pipeline.



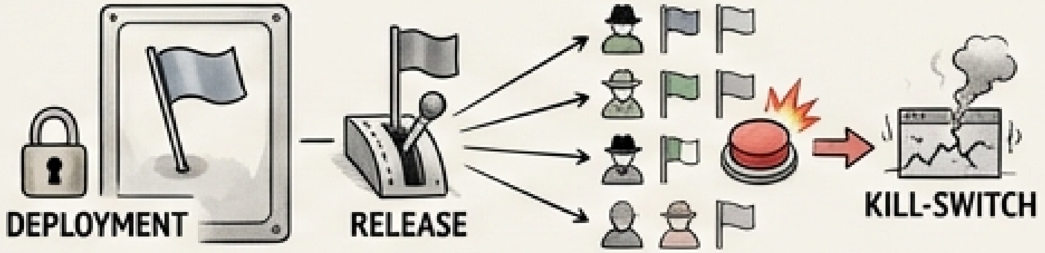
Deployment Strategies: Minimize Downtime and Risk

- **Blue-Green Deployment:** Provides instant rollback capability and zero-downtime switching between environments.

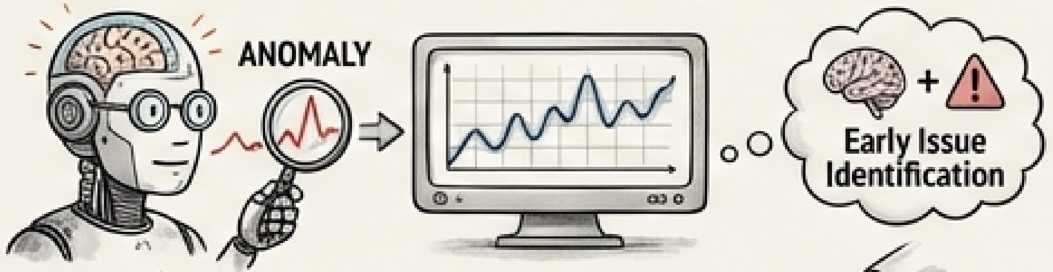


- **Canary Releases:** Gradual rollout (1% → 10% → 50% → 100%) allowing observation of impact on a smaller user base.

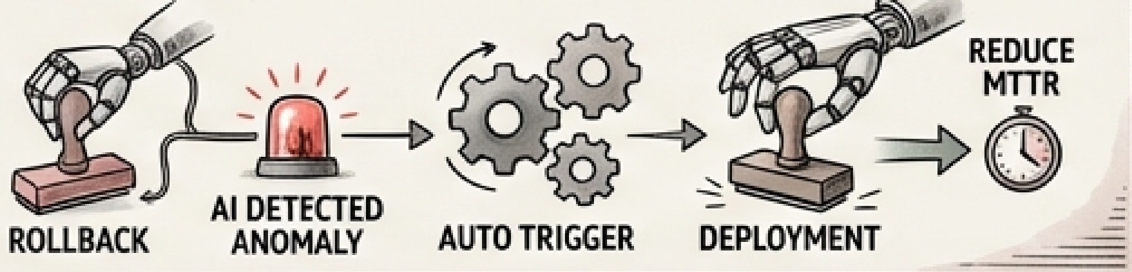
- **Feature Flags:** Decouple deployment from release, enabling targeted rollout and a kill-switch for problematic features.



- **AI-Assisted Deployment Analysis:** Uses anomaly detection on metrics during canary releases to identify issues early.

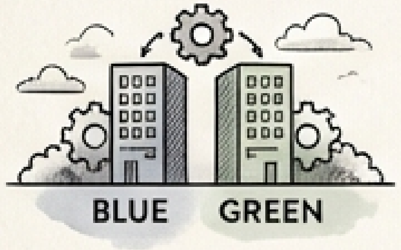


- **Automated Rollback Triggers:** Initiate rollback automatically based on AI-detected anomalies, reducing MTTR.

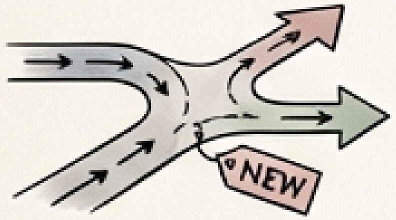


Deep Dive: Blue-Green Deployments

BLUE (LIVE)
NEW VERSION
GREEN (STAGING)



- Operate two identical production environments: Blue (live) and Green (staging).



- Deploy the new version to the Green environment while Blue continues to serve traffic.

- Thoroughly test the Green environment before switching traffic from Blue to Green.

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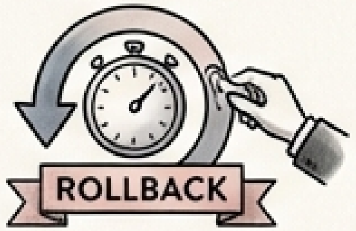
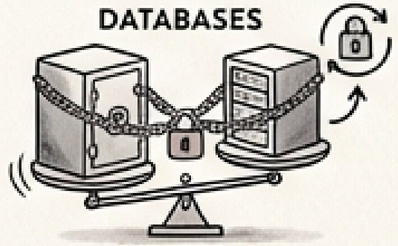


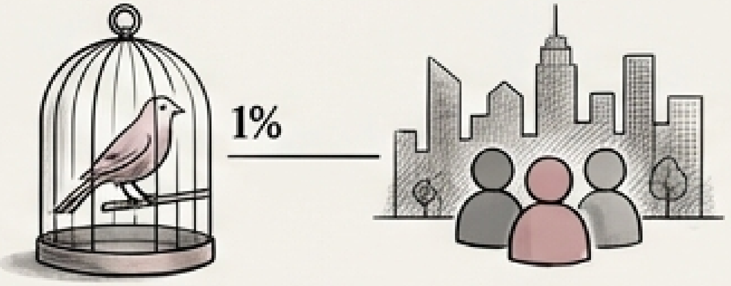
- Instant rollback capability by simply switching traffic back to the Blue environment.



- Requires careful management of databases and persistent storage to ensure data consistency during the switch.

Deep Dive: Canary Releases

- Rollout new features to a small subset of users (e.g., 1%) to test in a real-world environment.
- Gradually increase the percentage of users exposed to the new feature (e.g., 10% → 100%).
- Monitor key metrics (error rate, latency, resource utilization) for anomalies during each stage of the rollout.
- Automated rollback triggers can be configured to automatically revert to the previous version if anomalies are detected.
- Allows for early detection of issues that may not be apparent in testing environments.



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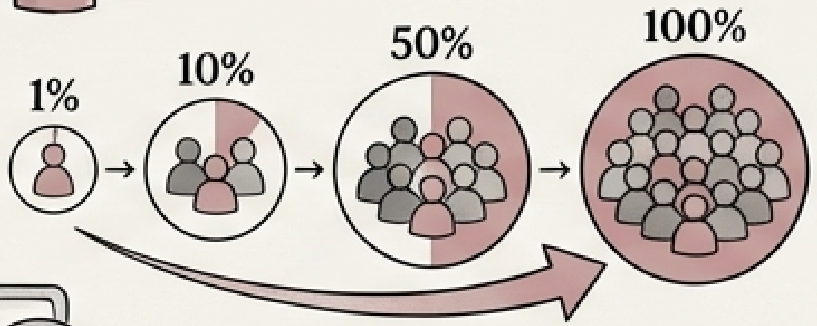

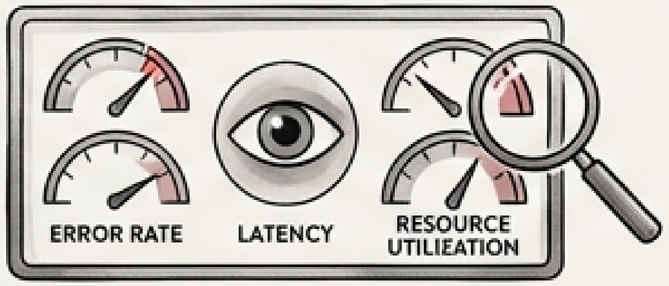

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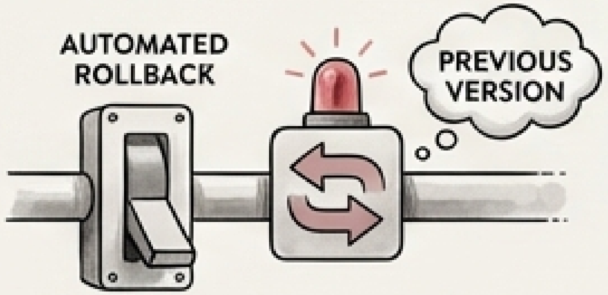

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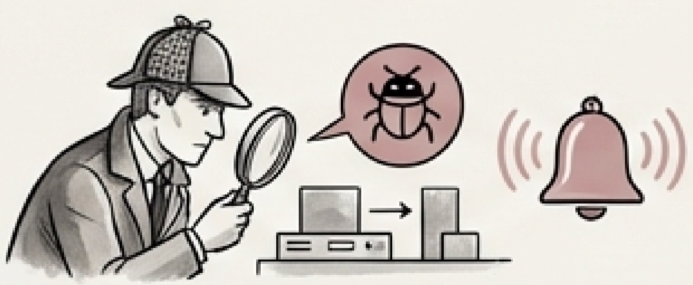
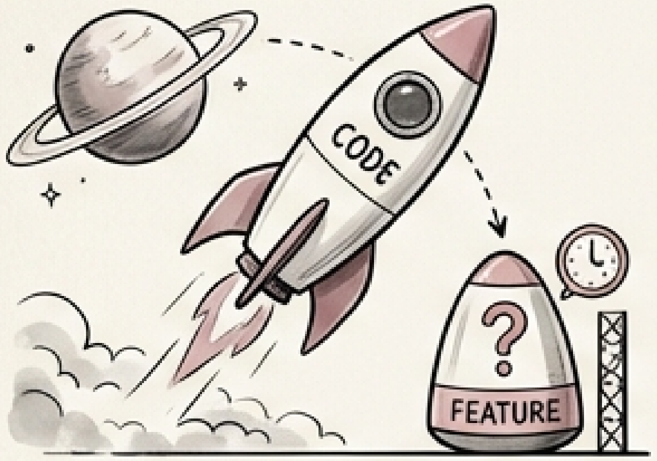


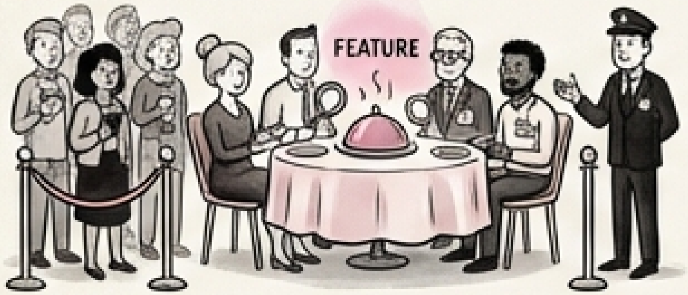
Allows for early detection of issues that may not be apparent in testing environments.

Deep Dive: Feature Flags

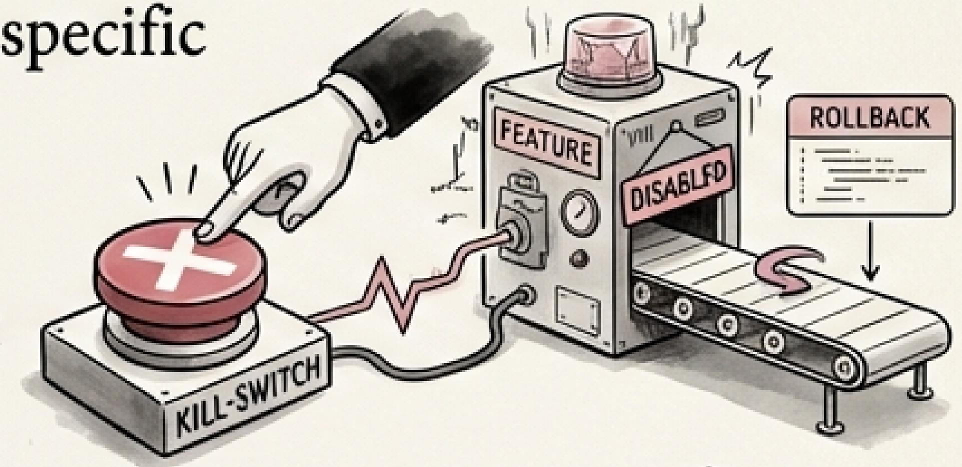


- Separate code deployment from feature release, allowing code to be deployed before a feature is ready for public use.

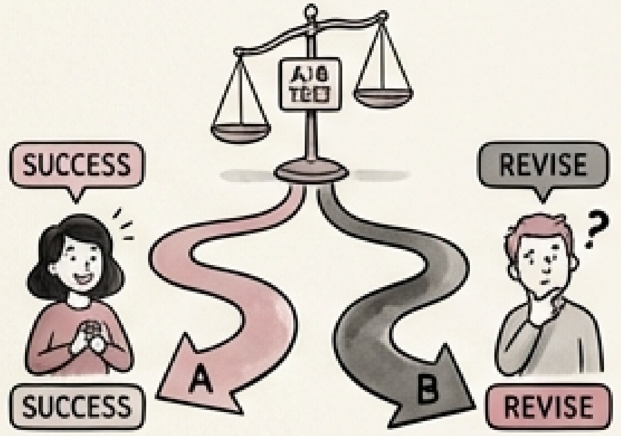
- Enable targeted rollout of features to specific user segments or beta testers.



- Provide a kill-switch to instantly disable a problematic feature without requiring a code rollback.



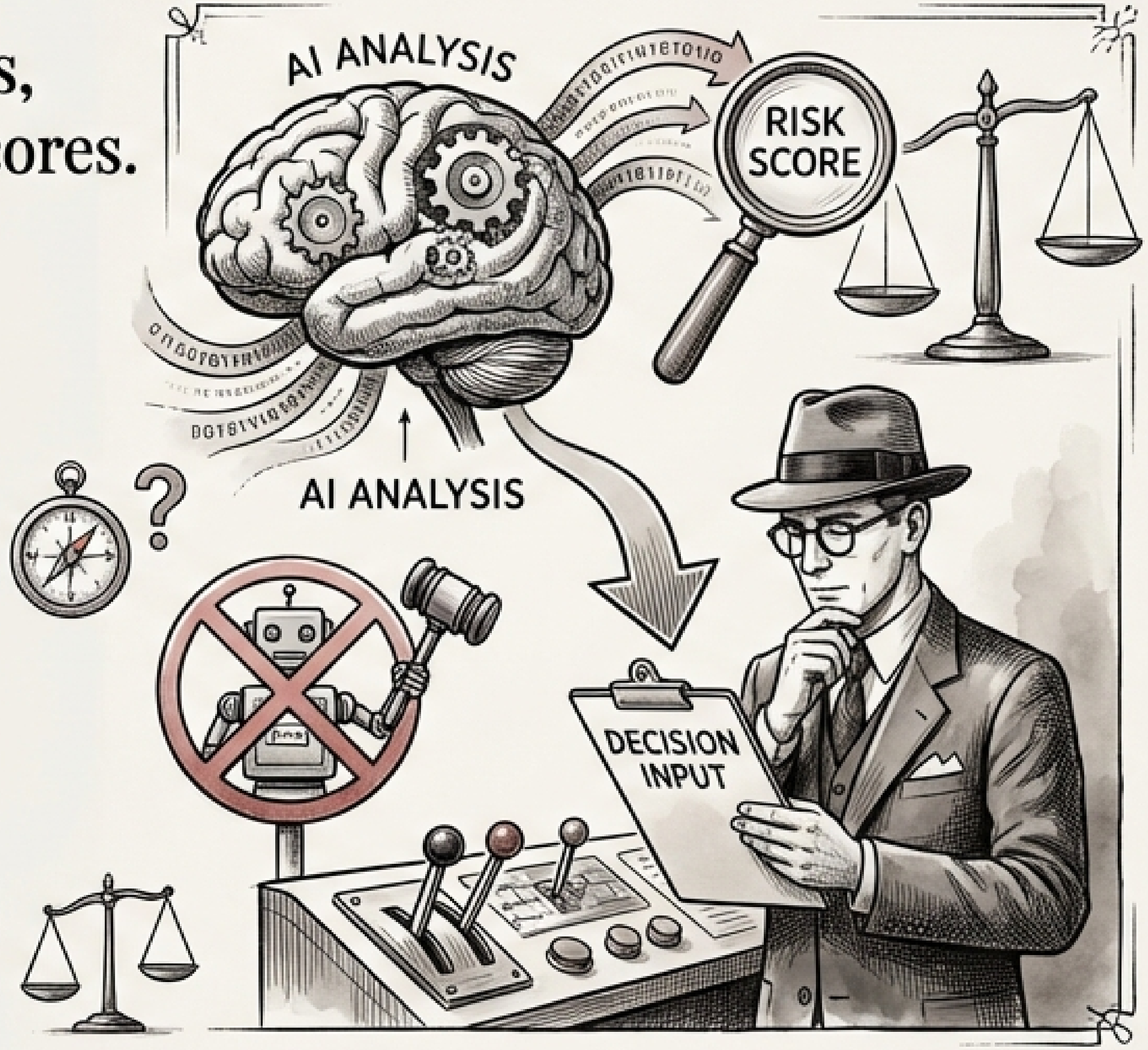
- Can be used for A/B testing to compare the performance of different feature implementations.



- Require careful management to avoid technical debt and complexity.

AI-Generated Change Risk Assessment: Augmenting, Not Replacing

- AI analyzes change scope, affected components, and historical defect data to assign initial risk scores.
- AI assists triage of changes, enabling faster identification of high-risk modifications.
- Limitations: AI lacks business context and an understanding of organizational impact.
- AI may underestimate cascading effects and the potential for unforeseen consequences.
- Crucially, AI output serves as input to human decision-making, not a replacement for it.



Rollback and Recovery: Preparing for the Inevitable

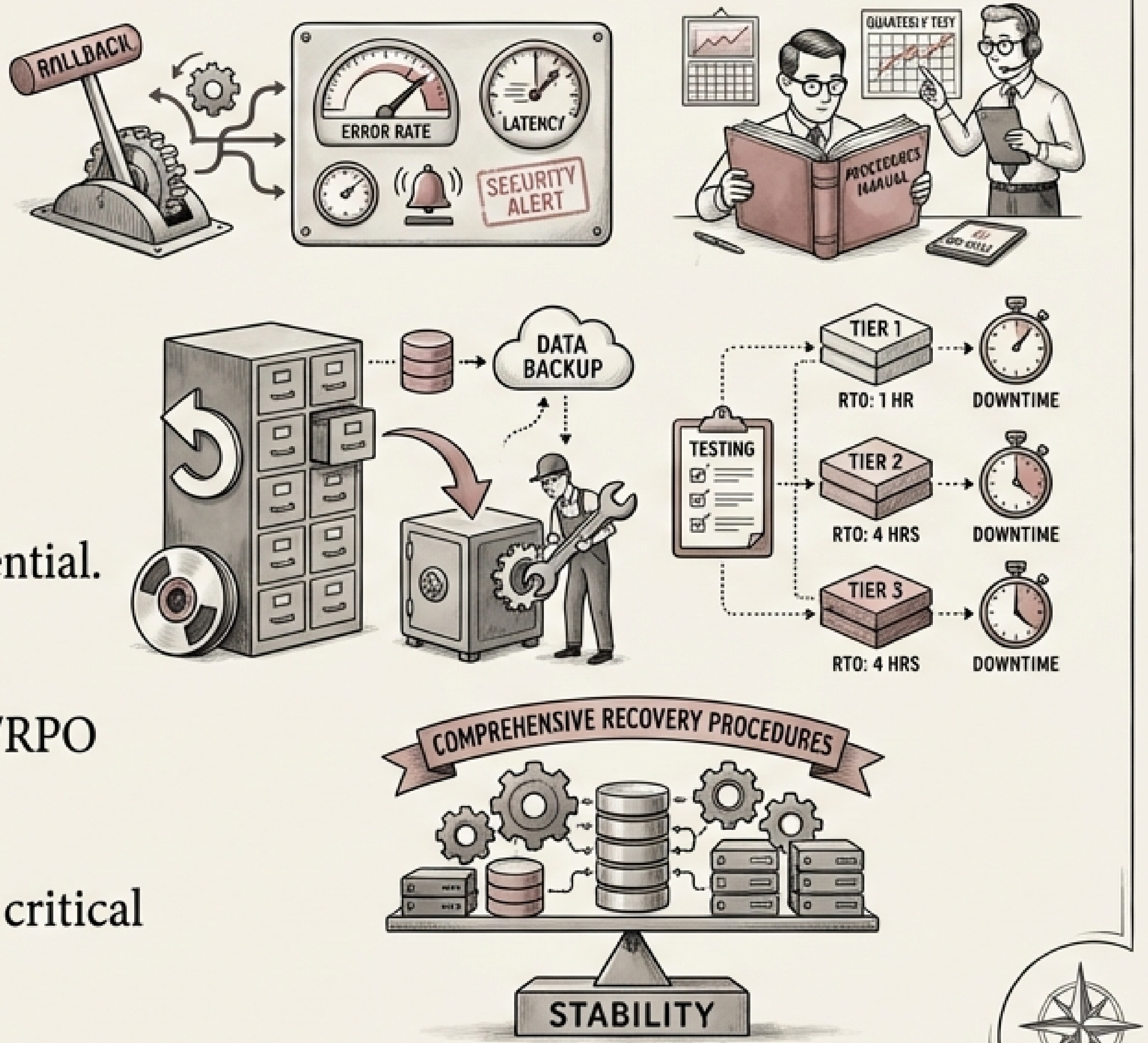
- **Automated Rollback Triggers:** Error rate exceeds a predefined threshold, Latency SLA is breached, or a security alert is fired.

- **Rollback Procedures:** Must be documented, tested quarterly, and easily accessible to on-call engineers.

- **Database Rollback:** Migration reversibility testing is essential. Always **back up data** before schema changes.

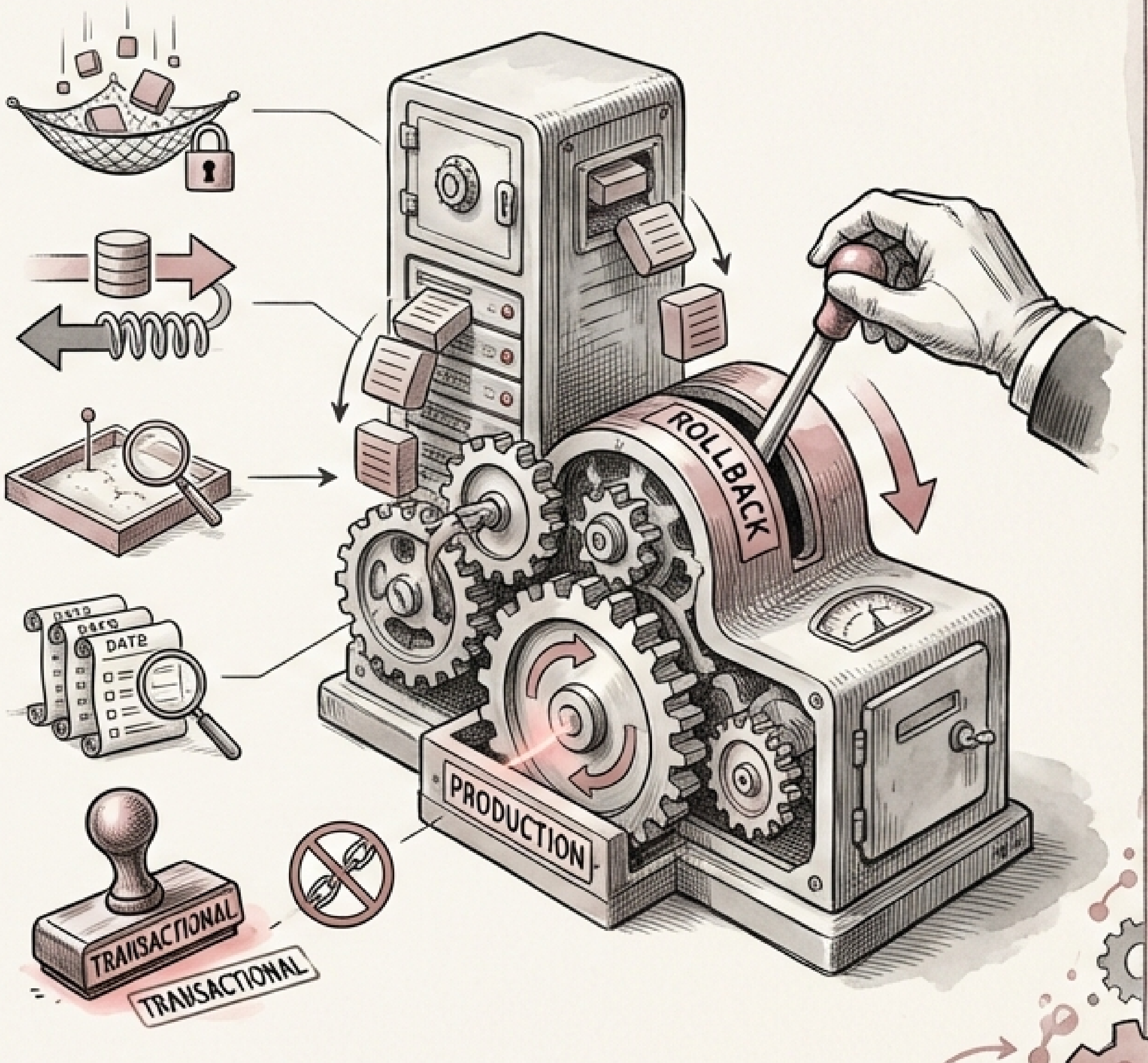
- **Recovery Time Objectives (RTO):** Define and test RTO/RPO for every service tier to minimize downtime.

- **Comprehensive rollback and recovery procedures** are critical for maintaining system stability.



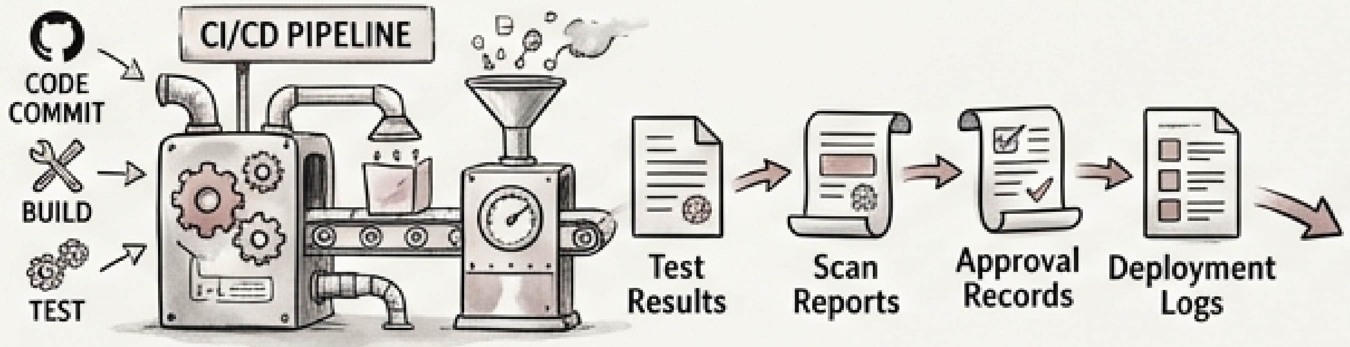
Database Rollback Strategies: Ensuring Data Integrity

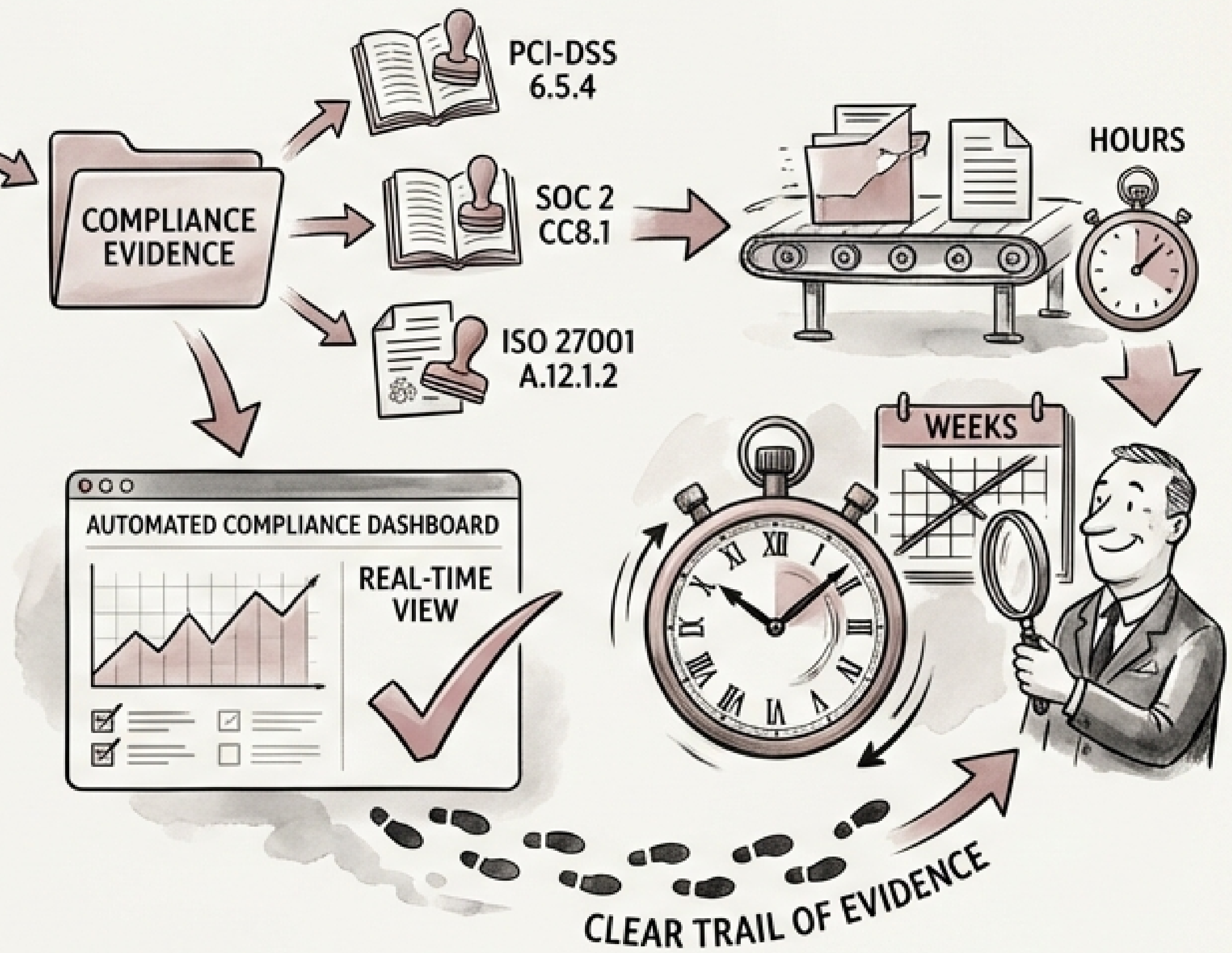
- Always create a full database backup before applying any schema changes or data migrations.
- Design database migrations to be reversible, allowing for easy rollback to the previous state.
- Test migration reversibility in a staging environment before applying changes to production.
- Implement data versioning to track changes and facilitate data recovery.
- Consider using transactional DDL to ensure that schema changes are applied atomically and can be rolled back if necessary.



Database Rollback

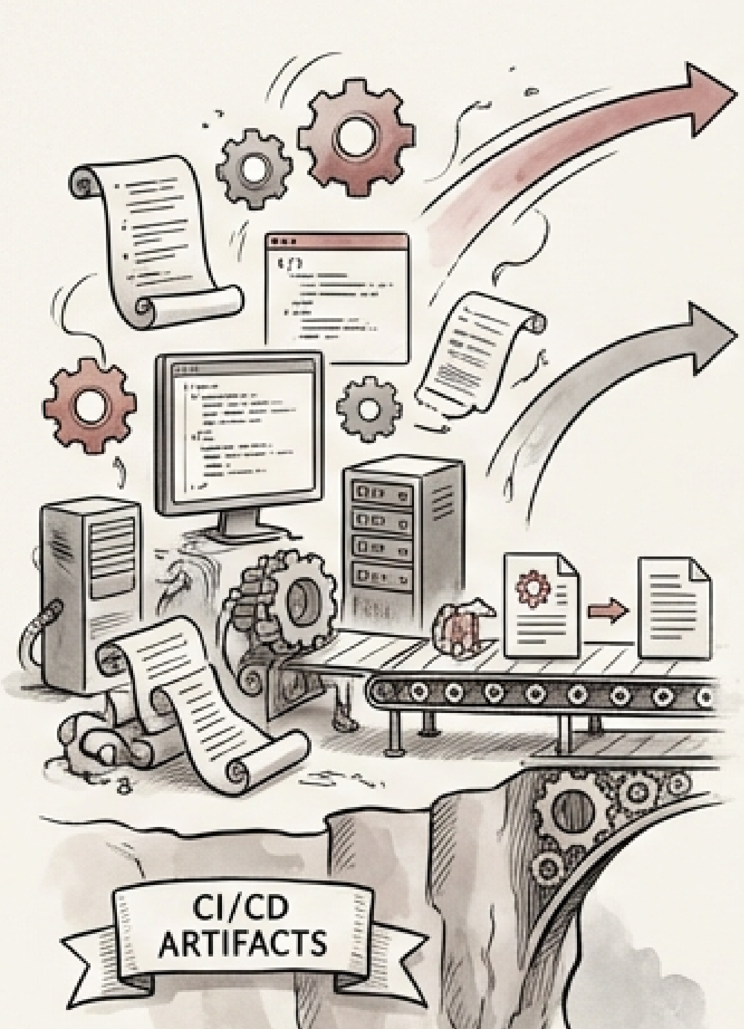
Compliance Evidence from CI/CD: Automating Audit Readiness



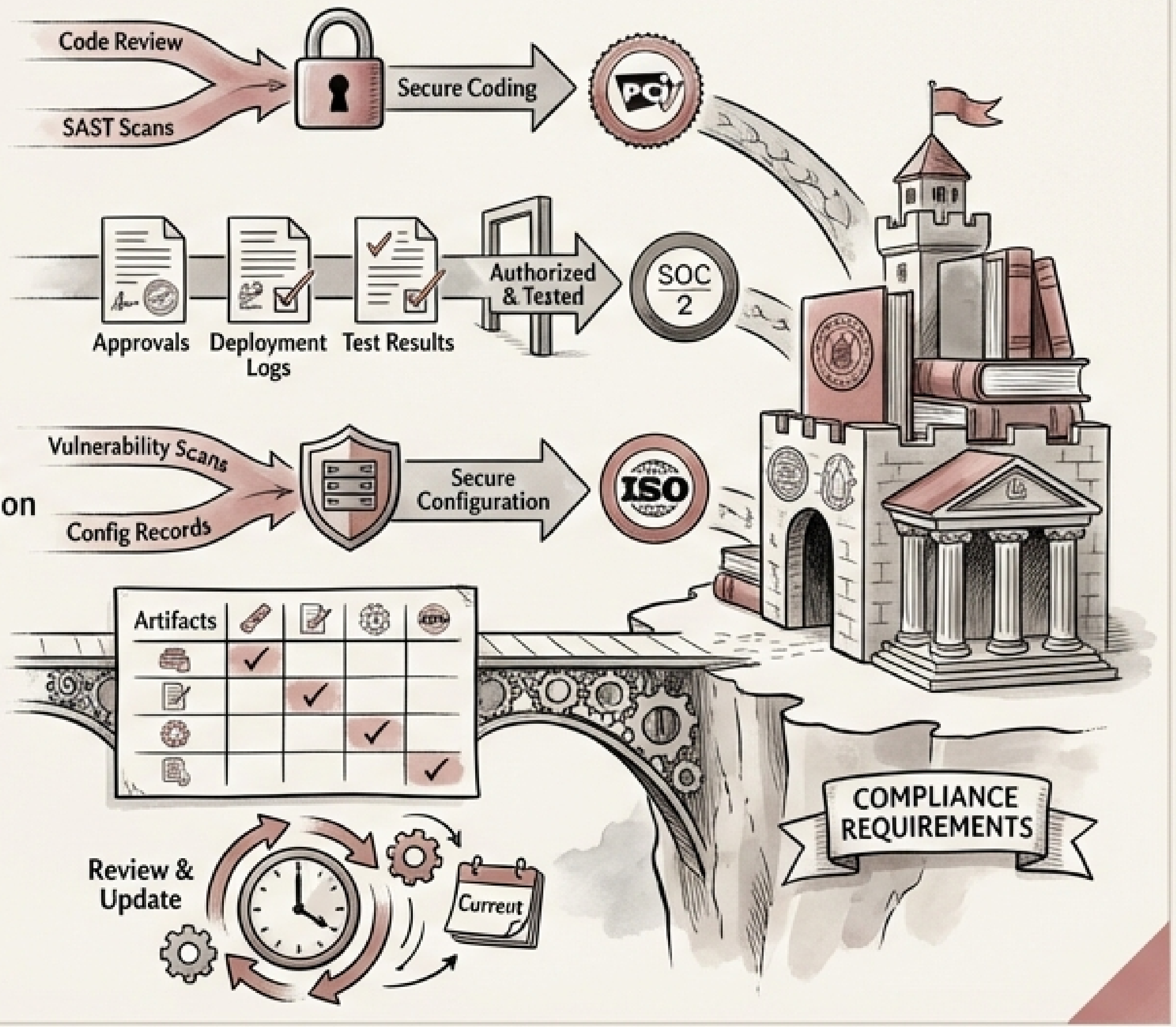


- ✓ Every pipeline run generates **compliance artifacts:** test results, scan reports, approval records, and deployment logs.
- ✓ Map these artifacts to **specific regulatory requirements** (e.g., PCI-DSS 6.5.4, SOC 2 CC8.1, ISO 27001 A.12.1.2).
- ✓ **Automated compliance dashboard** aggregates artifacts and provides a real-time view of compliance status.
- ✓ Automated compliance **reduces audit preparation time** from weeks to hours.
- ✓ **Ensure that the pipeline is auditable** and provides a **clear trail of evidence** for all changes.

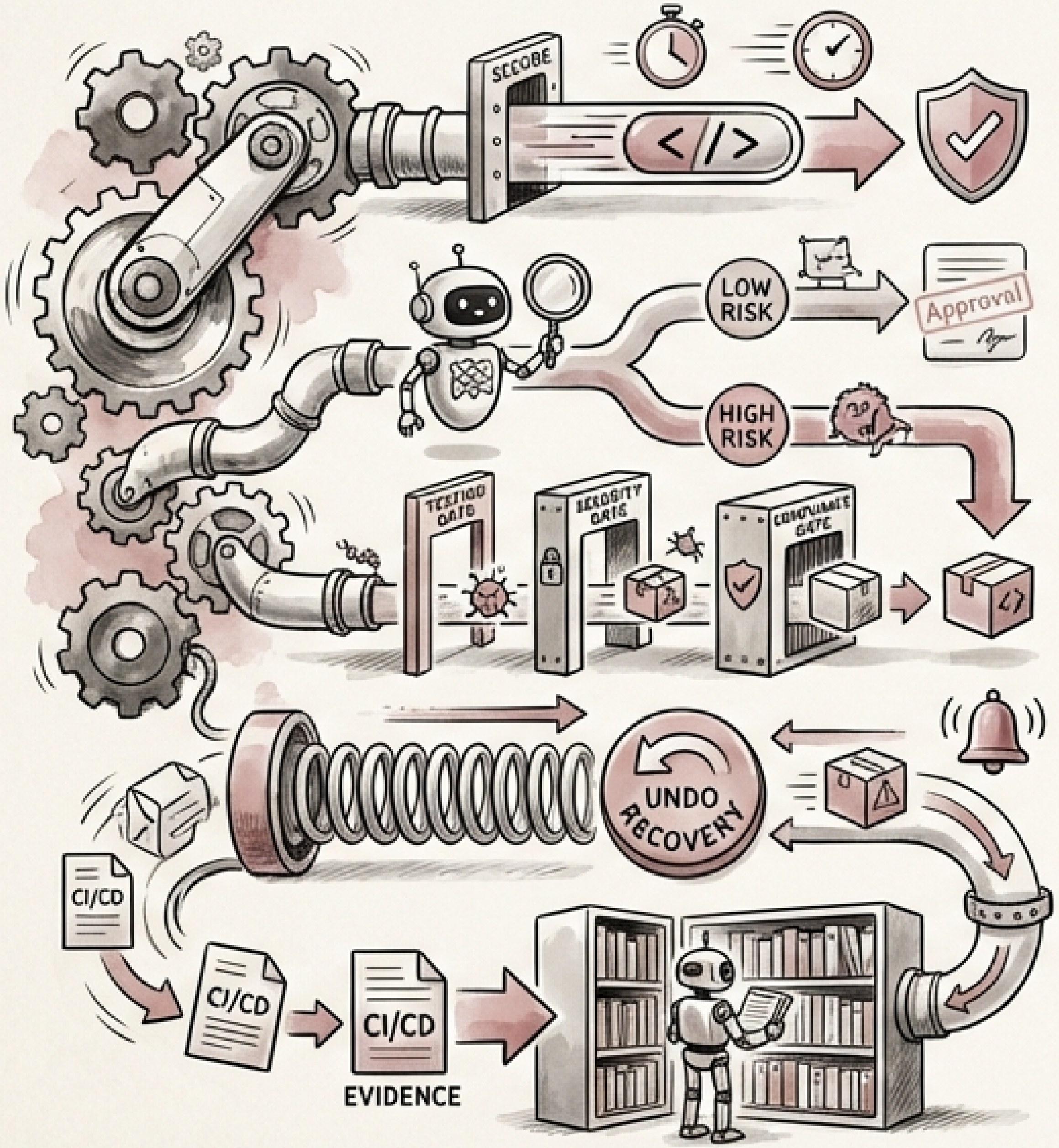
Bridging the Gap: Mapping Artifacts to Compliance Requirements



- **PCI-DSS 6.5.4 (Change Management):** Map code review records and SAST scan results to demonstrate secure coding practices.
- **SOC 2 CC8.1 (Change Management):** Use approval records, deployment logs, and test results to show that changes are properly authorized and tested.
- **ISO 27001 A.12.1.2 (Change Management):** Use vulnerability scan reports and configuration management records to demonstrate secure configuration management.
- Maintain a matrix that explicitly links CI/CD artifacts to relevant compliance requirements.
- Regularly review and update the mapping matrix to ensure that it remains accurate and complete.



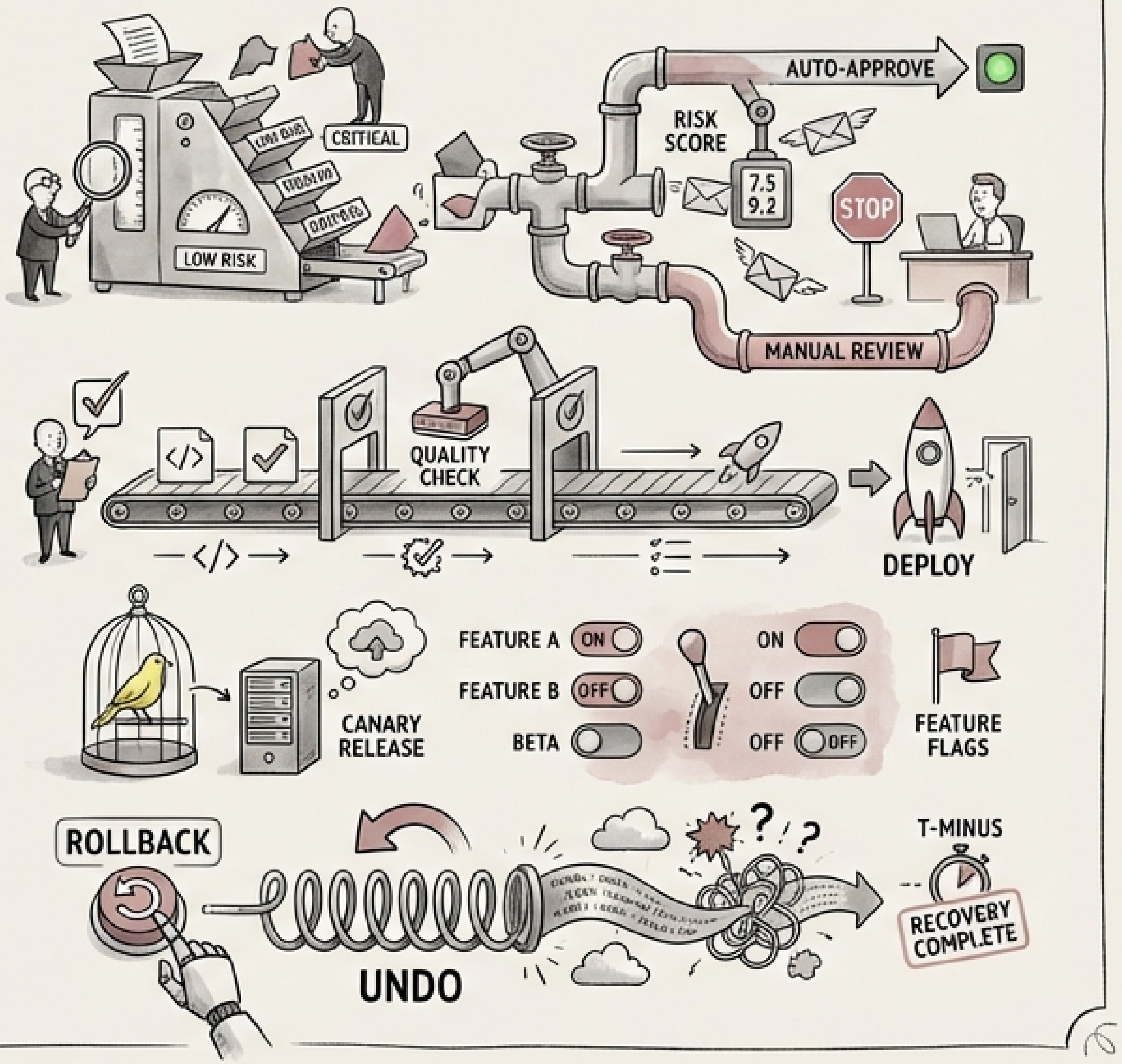
Key Takeaways: Embracing Automated Governance for AI-Driven Development



- **Automated governance** enables **faster deployment** cycles while maintaining **quality** and **security.**
- **Risk-based routing** and **AI-assisted risk assessment** streamline the **change approval** process.
- Comprehensive release gates and deployment strategies **minimize the risk** associated with new releases.
- **Automated rollback and recovery** procedures ensure rapid response to incidents.
- **Compliance evidence** from **CI/CD** automates audit preparation and reduces compliance costs.

Next Steps: Implementing Automated Change Management in Your Organization

- Start by defining clear change classifications and risk assessment criteria tailored to your environment.
- Implement automated risk scoring and routing to streamline the change approval process.
- Integrate release gates into your CI/CD pipeline to ensure quality at every stage.
- Adopt deployment strategies like canary releases and feature flags to minimize risk.
- Automate rollback and recovery procedures to ensure rapid incident response.



Thank You

- Questions?