CICD
The SRE - DevOps Overlay

#whoami

- Safeer CM
- SRE / DevOps for 18 years
- Linkedin, Yahoo, Directi, Flipkart
- Cloud Architect and SRE/DevOps Consultant
- Author, Speaker, Meetup and Community Initiatives

Pre-Order on amazon

SRE Principles

- Embracing Risk
- Service Level Objectives
- Eliminating toil
- Monitoring
- Release Engineering
- Automation
- Simplicity

DevOps Practices

- Collaboration
- Continuous improvements
- Monitoring
- Automation

Class SRE implements DevOps

- Values based on collaboration and communication
- Changes are necessary for progress, accepts the risks
- Change and release management
- Automation and platform engineering
- Observability

A recurring theme

Change

Changes drive everything

- Changes drive product features
- Features drive business value.
- Changes improves product stability
- Stability leads to reliability reliability

Changes can lead to..

- Production outages
- Bugs
- SLA breaches
- Financial losses
- Reputation impact
- Bad user experience

Software Change management - SCM

- Pick changes that has a positive impact on products and services
- Assess and accept the risks involved in the change
- Ensure automation is in place to track changes
- Test and verify correctness and production worthiness of the change
- Build and Release the change

Continuous Integration and Continuous Delivery

- CICD - Is (or should be) the vehicle of change in your organization.
- SCM - Issue trackers and code repositories
- CICD
  - Test and verify the change - code, config, infra
  - Compliance and security
  - Build the software artifact
  - Deploy to environments

CICD
The SRE - DevOps overlay

Testing - Functional and Non-Functional

Functional vs Non-Functional Testing

Unit testing	Performance testing
Integration testing	Scalability testing
Smoke testing	Resilience testing
Regression testing	Security testing

Application Configuration

- Config files embedded with code
- Environment variables
- External key value stores
- Feature Flags

Infrastructure and configuration

- Configuration management tools
- Infrastructure as code
- Network as code
- GitOps

GitOps and CICD

- Philosophy for resources and systems management
- Desired state expressed declaratively
- Versioned and immutable - Git
- Pulled automatically
- Continuously Reconciled

GitOps and the X-as-Code Revolution

- Policy-as-Code
- SLO-as-Code
- Observability-as-code
- Pipelines-as-code

Evolve your CICD

- Your CICD should evolve accommodate all these use cases
- Codify all SRE/DevOps practices to the extent possible

Advanced SRE - DevOps Practices with CICD

- SBOMs
- Supply chain security
- DORA
- …..

Continuous Delivery Foundation (CDF)

The Continuous Delivery Foundation (CDF) serves as the vendor-neutral home of many of the fastest-growing projects for continuous integration/continuous delivery (CI/CD).

It fosters vendor-neutral collaboration between the industry's top developers, end users and vendors to further CI/CD best practices and industry specifications.

The CDF will evangelize CI/CD methodologies, define/document best practices, and create training materials to enable any software development team around the world to deliver code changes faster and more reliably

https://cd.foundation


cd
events


Jenkins


JENKINS X


ORTELIUS

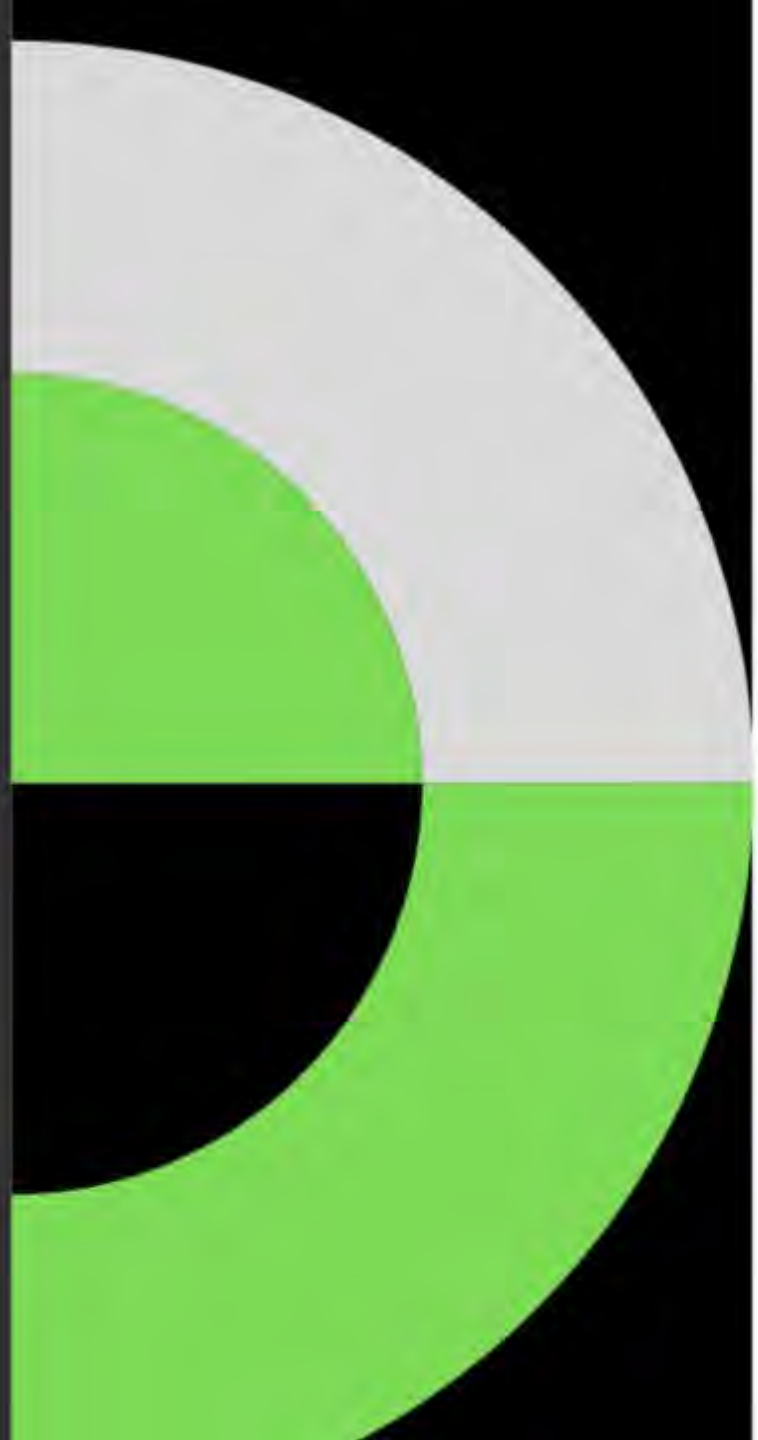

PYRSIA


Screwdriver.cd


SHIPWRIGHT

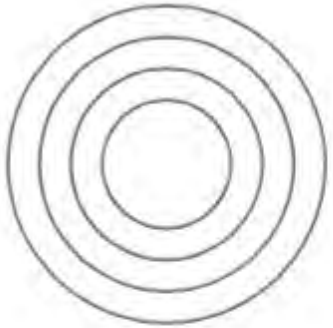

Spinnaker


TEKTON



Continuous Integration & Delivery
The SRE - DevOps Overlay

NOW LET'S GET TO WORK.



Crowdbyte SOLUTIONS

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CONTINUOUS INTEGRATION & DELIVERY

THE SRE - DEVOPS OVERLAY

CANADA DEVOPS COMMUNITY OF PRACTICE

GARIMA BAJPAI
FOUNDER CANADA DEVOPS COMMUNITY OF PRACTICE

Site Reliability Engineering and DevOps ..
Challenges and Opportunities

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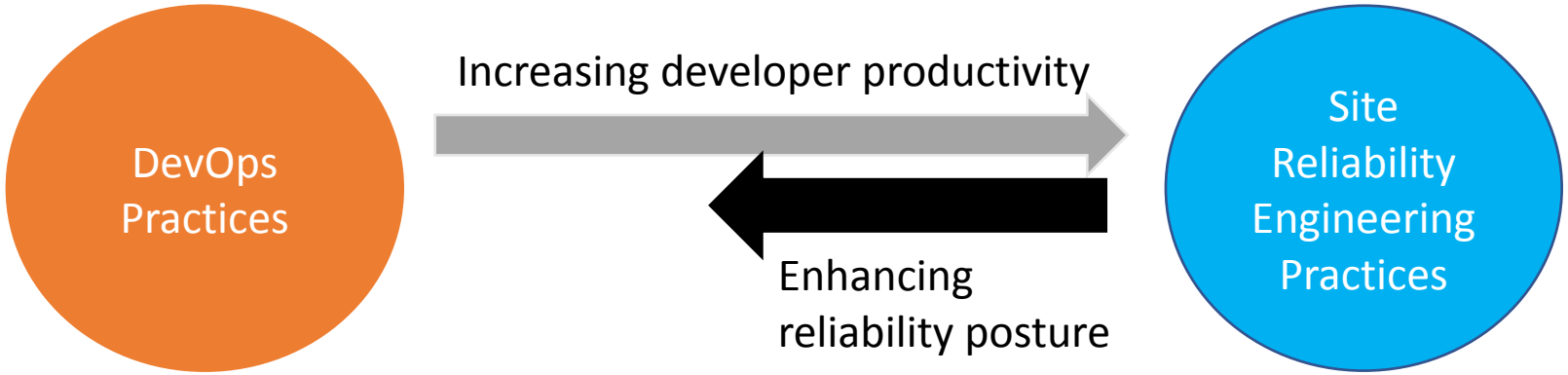
- **Exponential growth in tools –** It is hard to believe that we only started a decade or so ago, with most of the practices & concepts in continuous delivery space.
- **Complexity –** It is inevitable that complexity is increasing, with rapid adoption and there are new risks, operational overhead and cognitive load on the practitioners.
- **Cost –** With more and more services and applications moving to the cloud, financial practices and engineering practices are getting tightly integrated.
- **Skill shortage –** There are many aspects of learning, many people getting behind due to lack of time for self-development is introducing a major skill shortage

Site Reliability Engineering and Continuous Delivery Optimal Operating model



"To fully realize the potential of DevOps at scale, the integration of SRE principles is essential. Balancing investment in tools and upskilling for reliability vis-a-vis rapid innovation in CD would be an **optimal operating model** for the digital economy. However, it is important to note that as SRE comes of age, it faces scalability, growth, and complexity challenges as well" .

Site Reliability Engineering and DevOps
Optimal Operating model – Continuous Delivery overlay!

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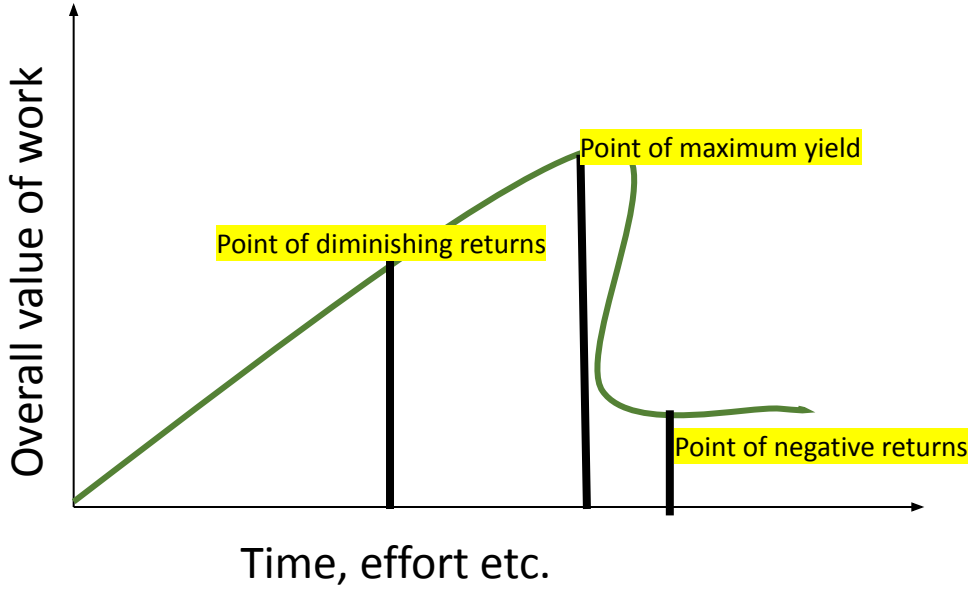
The law of diminishing returns (also known as the law of diminishing marginal productivity) states that in productive processes, increasing a factor of production by one unit, while holding all other production factors constant, will at some point return a lower unit of output per incremental unit of input.



Optimal Operating Model across individuals, communities, and systems

How do I know if my organization is ready for **SRE - DevOps Overlay?**

Better Reliability Posture and Overall productivity

Continuous Delivery – Common Core

Optimal Operating Model across individuals, communities, and systems
How do I know if my organization is ready for **SRE - DevOps Overlay?**

- Why am I deploying?
- What am I deploying? (Monoliths vs. Microservices)
- Where am I deploying to? What are the core objective for modernization?
- How many cloud providers are involved? How could I keep them converged?
- How often do I want do deploy and why?

- **#1**. **Declarative**: The entire system has to be described declaratively.
- **#2. Versioned and immutable**: The canonical desired system state is versioned in Git.
- **#3**. **Pulled automatically**: Approved changes are automatically applied to the system.
- **#4. Continuously reconciled**: Software agents to ensure correctness and alert on divergence.

Better Reliability Posture and Overall Stability

Beyond DORA

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Functional advancements

1. Functional **“Super cloud”** or sometime referred as **“cross cloud”,** providing interoperability with especially continuous delivery capability
2. Using an **event-driven** approach introduces a high level of reusability, flexibility and full stack interoperability for the complete software lifecycle.
3. Combining **progressive delivery with machine learning** capability and reducing the challenges of adoption of progressive delivery.
4. Silver bullet **for SBOM of the future** – As SBOM (Software bill of material) continues to evolve, so is the framework for data interchange and the need for a standard format.

Software Supply Chain Security
SBOM spotlight

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An **SBOM is foundational to managing the complexity and securability** of modern software deployments. And product leaders must meet the growing demand for technology, best practices and solutions to support the delivery of SBOMs," Gartner analyst Mark Driver wrote in a research report titled *Emerging Tech: A Software Bill of Materials Is Critical to Software Supply Chain Management*.

- Gartner believes that by 2025, 60% of organizations procuring mission-critical software solutions will mandate **SBOM disclosure** in their license and support agreements, up from less than 5% in 2022

Better Reliability Posture and Overall productivity

Beyond DORA – Data-Driven Metrics and SLO

Operational advancements

- **Portability**: variety of programming languages, platforms and frameworks
- **Flow Optimized & Observable**: Decentralized and distributed management
- **Resource Optimized & resilient**: Optimized posture of infrastructure
- **Real-time and dynamic**: Support rapid scale up and scale down and address real time requirements

Better Reliability Posture and Overall productivity

Beyond DORA – Data-Driven Metrics and SLO

- **Infinite bandwidth and Zero-latency** – Connect the demand and supply value chain in a T-Model approach like Uber, we create possibilities of the abundance of talent through optimal use.
- **General Purpose Pipelines & Services** – Some of the needs are fundamental, general-purpose, and reusable.
- **Small and Medium Business Services** – “Think small first” approach to technology onboarding and related services.
- **High-performance Community collaboration hubs** – Most will need a pulsating environment by, with, and for entrepreneurs. DevOps as a service with a community around it creates a possible futuristic approach.

Advanced Reliability Engineering and CD: Platform, Tools & Application

- **Enabling full-stack interoperability and enhancing reusability** - Functional advancement of continuous delivery and an event-driven approach towards continuous delivery.

- **Go-beyond cloud native to edge native** - Architectural advancement towards how we develop and deploy applications and and increasing the prospects for organizations to enhance the business footprint.

- **State of art AI capabilities** - Operational advancement of continuous delivery with some capabilities in the formative phases like AIOps, integration of machine learning and recent excitement around ChatGPT and OpenAI.

Advanced Reliability Engineering and CD

Net-Zero Commitment – SRE Can Lead the Way

One of the critical threads which ties everything together is “Net-Zero Commitment” - SREs can lead the way! What if, we can create a marketplace for carbon neutral products & services where we can cascade the impact. If we would intend to do so we might have to consider future evolutionary changes and some of the next steps could be as follows

- Map out carbon footprint for products and services and **identify hotspot features**
- Guidelines for the **financing of ICT products & services** based on carbon footprint
- **Certification** for green ICT services & products and standardize net-zero outlook
- **Decarbonization** of ICT services & products through tools & processes

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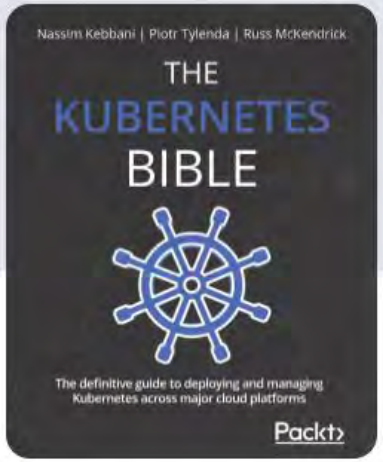

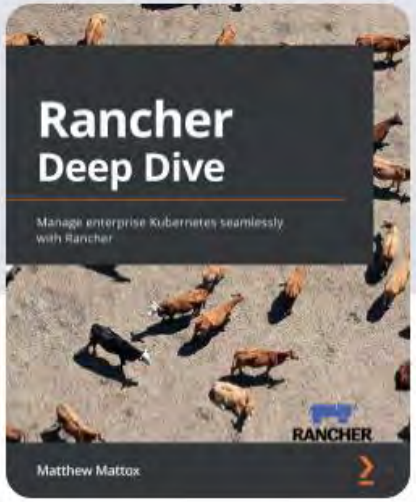

Reference books
Publisher - Packt

Thanks for being here!

NOW LET'S GET TO WORK.