



DevOps and Storage Management

Improving Storage Delivery Through
Continuous Improvement and Automation

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DiscretelO



What is DevOps?

- Collaborative Culture
- Automation Tools
- Metrics and Measurement
- Lean Principles
- Agile

What is DevOps

- *“a cross-disciplinary community of practice dedicated to the study of building, evolving and operating rapidly-changing resilient systems at scale.” - Jez Humble*

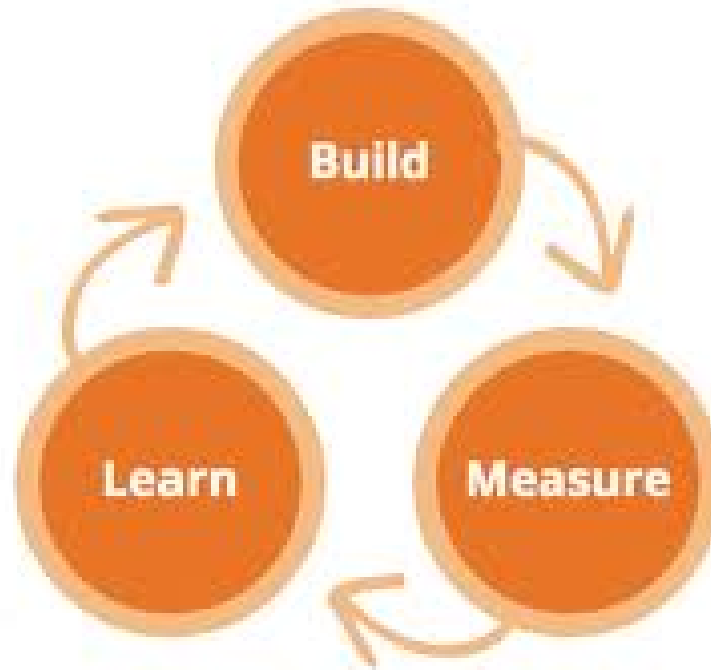
What is DevOps?

- Multi-disciplinary teams sharing the same tools and metrics, using Lean and Agile principles to deploy and manage complex systems at scale.

What is Lean?

- Lean management is an approach to running an organization that supports the concept of continuous improvement, a long-term approach to work that systematically seeks to achieve small, incremental changes in processes in order to improve efficiency and quality.

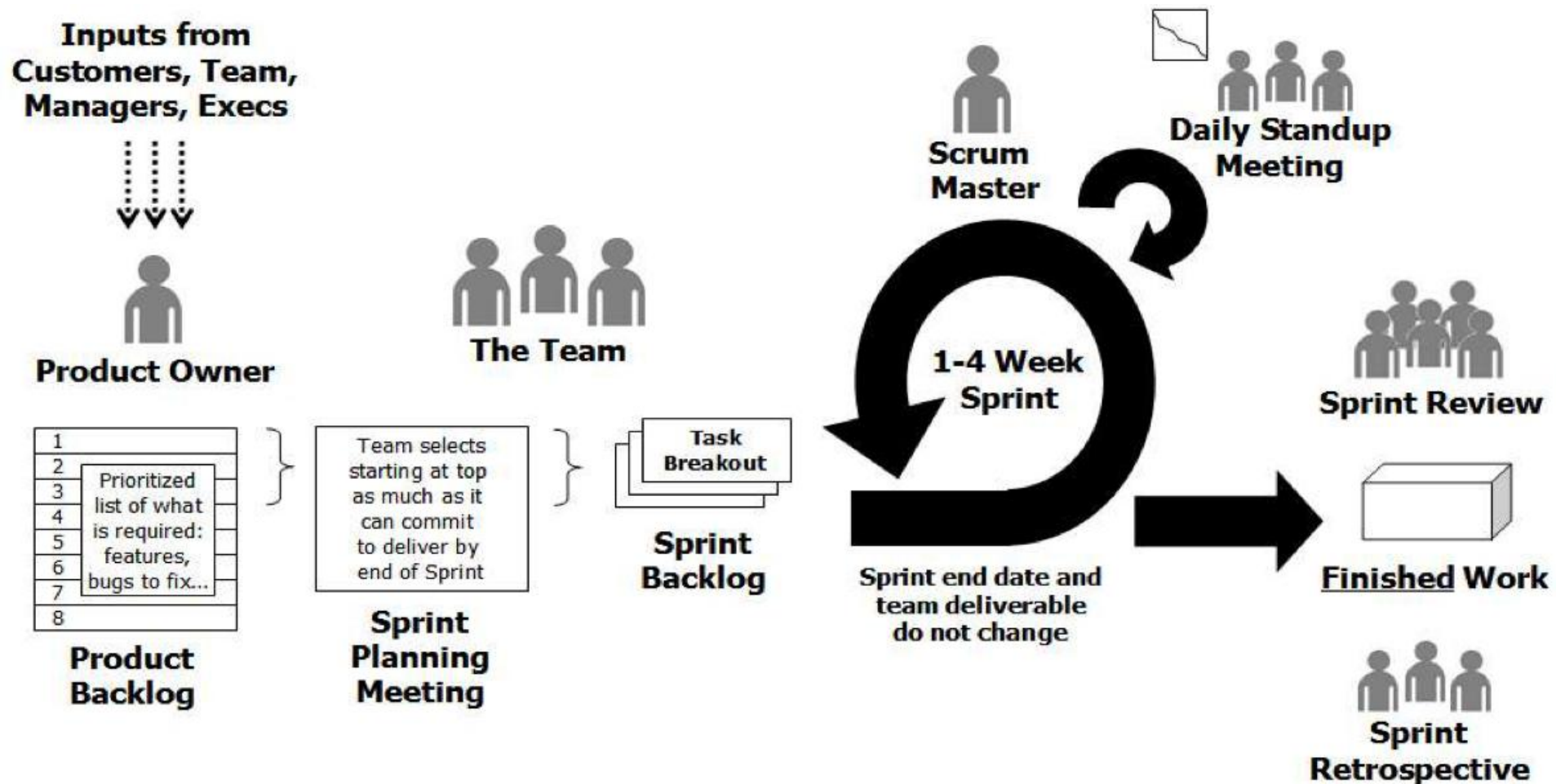
What is Lean?



What is Agile?

- A software development methodology that emphasizes close collaboration between developer teams and business experts, face-to-face communication, frequent delivery, and tight, self organizing teams

What is Agile?



What is Agile?



What does this have to do with storage?

- **Gather Metrics**
 - ◆ Make them available to everyone
- **Create and Improve Process**
 - ◆ Break up projects into manageable and measurable tasks
 - ◆ Involve other teams
- **Automate**

WE 
METRICS

Gathering Metrics – Service Metrics

- How long do tasks take?
- How many time do you do any given task?
- Is there anything that blocks your work?
- Record all failures
- Record all task blockers

Gathering Metrics - Events

- Storage Growth
- Free Capacity
- Total IOPS
- Latency
- Network Throughput
- FC Throughput
- All Failure and Error Events

Improve Processes



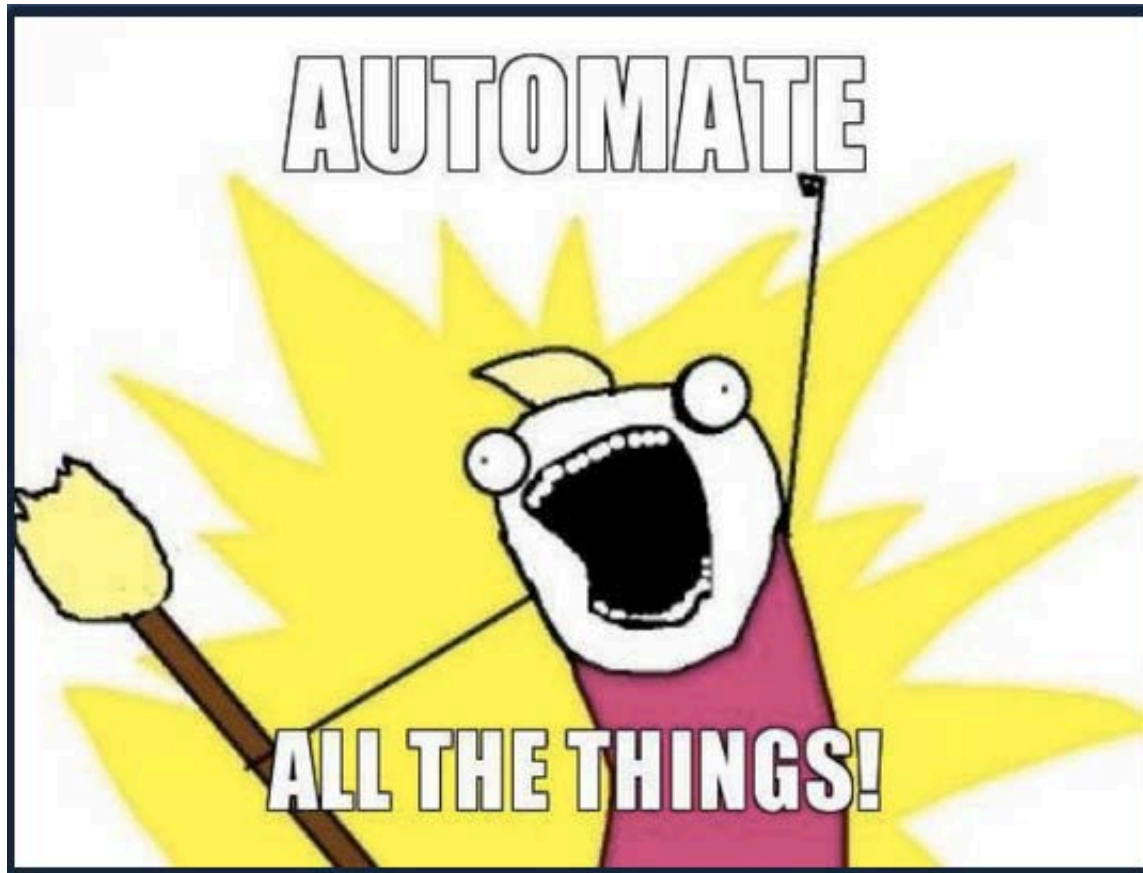
Continuous Improvement

- a long-term approach to work that systematically seeks to achieve small, incremental changes in processes in order to improve efficiency and quality

Continuous Improvement



Automation



- LUN and Volume Creation
- LUN and Volume Expansion
- Adding and Tuning Hosts
- Configuring Snapshots and Replication
- Backup
- Monitoring and Alerting
- Incident Logging

Automation Tools



CHEF™

graphite



A N S I B L E



logstash



vmware®



openstack



Jenkins

Putting it all Together

- Use service metrics to find repeated tasks
 - ◆ Automate all individual configuration tasks
 - ◆ Develop a task catalog
 - ◆ Develop a service catalog
- Use event metrics to set a benchmark
 - ◆ Use this benchmark to determine when a resource becomes “full”
 - ◆ Create alerts based on thresholds

➤ Keep it simple

- ◆ Start with a small catalog
- ◆ Limit choice to start

➤ There will be exceptions

- ◆ Exceptions are OK!
- ◆ Exceptions get processed by the continuous improvement loop

- DevOps principles like Agile and Lean can be applied to traditional infrastructure teams
- Gather a set of baseline metrics and use ongoing metrics collection to continuously audit and improve processes
- Automate as many tasks as possible

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