DEPENDABLE CLOUDS

Make Cloud use & operations more dependable

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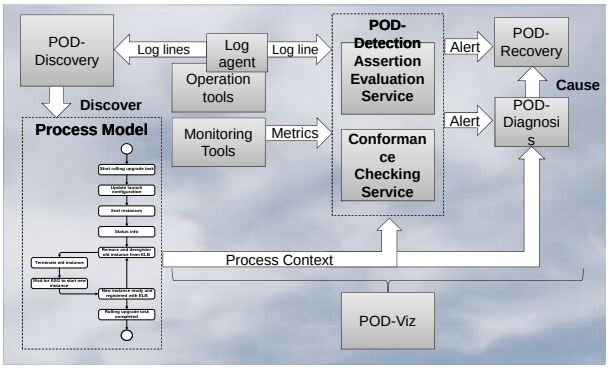
- Cloud consumer perspective
- Detecting and diagnosing errors during Cloud operations based on *process knowledge*
- Faster detection, automated diagnosis and recovery
- Improved security, reliability and predictability



Problem

- Majority of real world outages are caused by sporadic operations, e.g., deployment, upgrade, reconfiguration, etc.
- Highly frequent releases often with insecure deployment pipelines exacerbate the problem
- Cloud consumers have limited visibility and control of the Cloud platform
- Difficult to achieve predictable/reliable service with unpredictable/unreliable platform and operation

Solutions

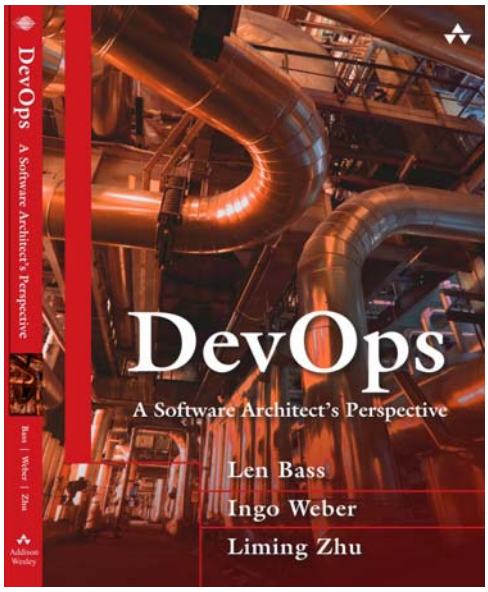
- **Process Oriented Dependability (POD):** Treat operations as processes and use *process context* to provide basis for near real time error detection, diagnosis, and recovery
- **POD-Discovery:** process discovered from logs/scripts
- **POD-Detection:** errors detected by process conformance checking and assertion checking on step outcomes
- **POD-Diagnosis:** errors automatically diagnosed for causes using fault trees, Bayesian networks and automated diagnostic testing
- **POD-Recovery:** undo or guided/automatic recovery
- **POD-Viz:** runtime visualization of operation progress and errors
- Security-enhanced and consistent deployment pipeline

Impact

- Cloud migration and disaster recovery spin-out Yuruware acquired by Unitrends in 2014
- POD tools partly released
- Patents pending
- Publications:
  - Research publications: DSN, QoSA, HotDep/HotCloud
  - Industry publications: 2 IEEE Software papers, LISA
  - Book: “DevOps: A Software Architect’s Perspective”, Addison-Wesley

Next Steps

- Integrate with monitoring systems to suppress false alarms
- Apply research results in ops to
  - big data analytics applications
  - security such as intrusion detection
- More industry trials
- Commercialization: reliableops.com



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