Configuration Management Summit

Cfengine
some facts

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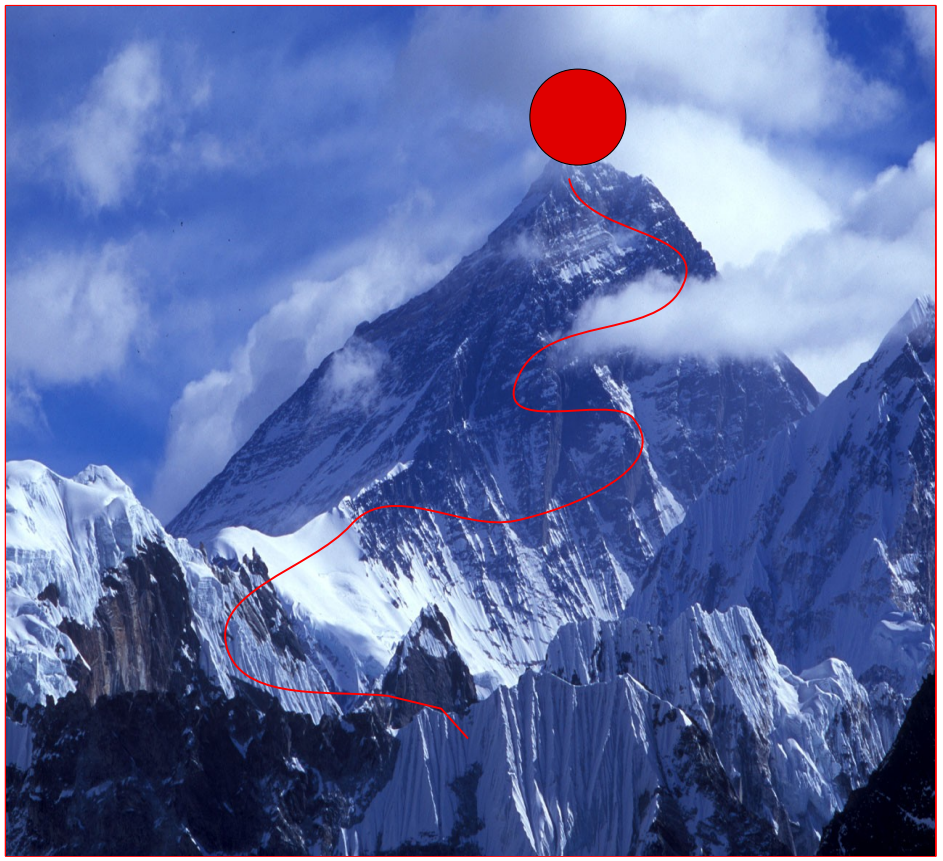
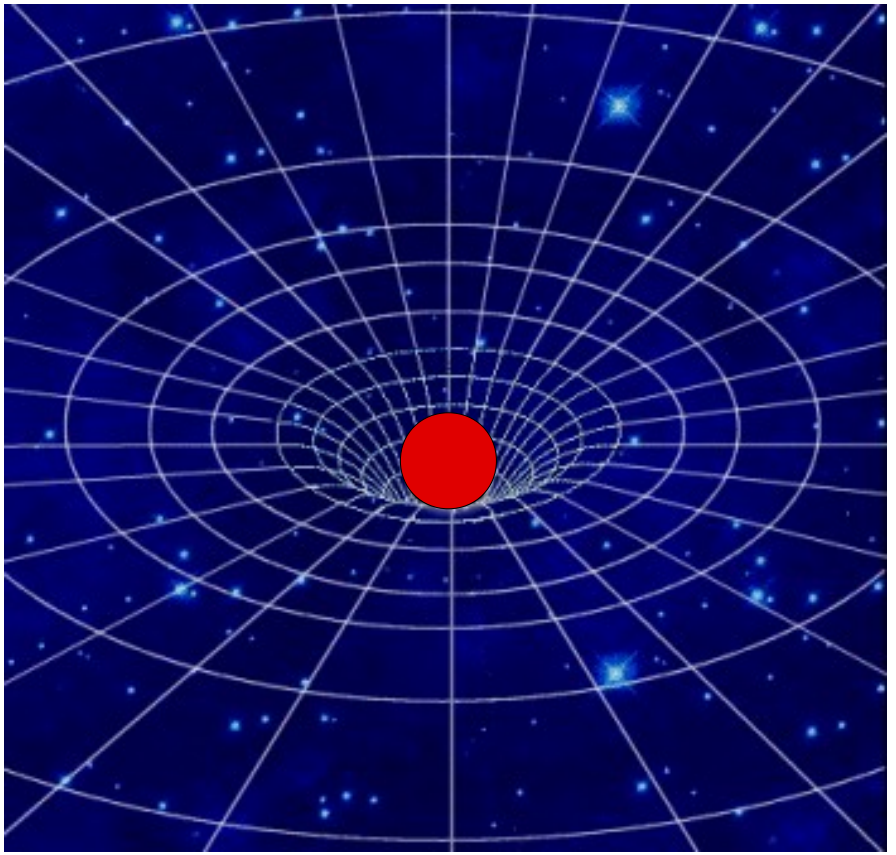
What is cfengine?

- An agent-based change management system, with “convergent” or “self-healing” semantics
- A largely declarative language for describing desired (or “promised”) states
- A self-learning monitoring framework
- A knowledge management framework
- Cfengine is written in C, with few dependencies

Convergence = self-healing



Baseline and recipe



Convergence to end state

History

- **1993** Introduced in at Oslo University as a cross platform interface that would document desired state, rather than change algorithms
- **1998** Re-interpreted in as a `computer immune system' (self-healing). Laid out a research programme for system administration.
- **1999-2002** Formalized concept of “convergence” and limits for system correctness (more than idempotence).
- **2003-2007** Developed Promise Theory to fully understand the issues of distributed compliance
- **2008** Rewrote Cfengine completely as a “promise engine”, preserving core technology and principles.

Uncompromised Principles

- Autonomy of control – not allowed to send Cfengine instructions from outside. Local system always has last word.
- Avoid unnecessary network use
- Pull not push (voluntary cooperation not attack)
- Use network opportunistically, not required
- Run many times – “system never gets worse” (convergence + idempotence)

Architecture

- Autonomous agents can work independently or cooperate by information-sharing on a peer-to-peer basis. Decentralized.
- Commonly used to implement “single point of control” while avoiding “single point of failure”.