PANORAMA

Continuous Deployment Specification for Large-Scale Systems

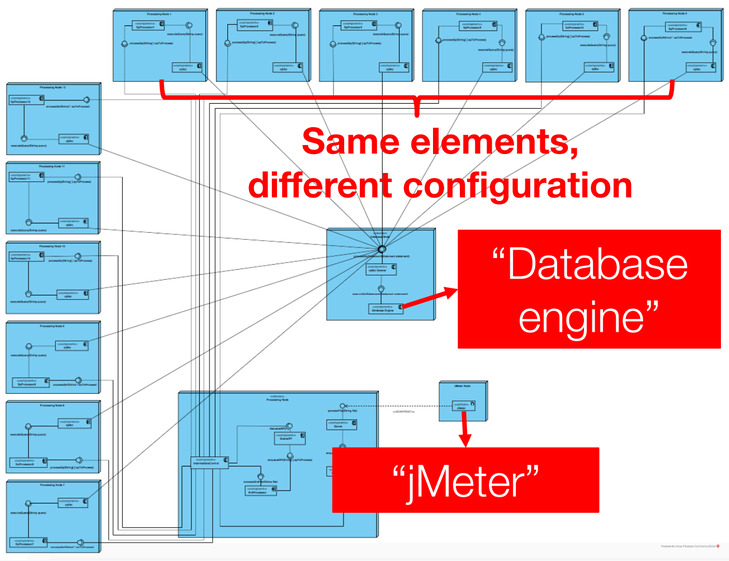
Missing links between deployment design and runtime concepts

Design time

Static deployment documentation tools

Run time

DESIGN & DEVELOPMENT → PROVISION → INSTALL → ACTIVATE → UPDATE → ADAPT



Example UML Deployment Diagram

- Deployment tools are intended for **static documentation** → usually outdated
- Architectural variations or design patterns are not first class concepts
- Deployment specification tools do not support deployment evolution
- The **UML deployment diagram**:
  - does not scale up well
  - is not suited for modelling Infrastructure provisioning, network configuration, and elasticity requirements
  - has no direct effect on the actual deployment, therefore many subsystems end up as illustrative elements

Deployment specification challenges

CH1 Notations for specifying and visualising deployments from different perspectives and levels of abstraction

- Stakeholders expect documentation at different **levels of detail and abstraction**
- Deployment and Configuration (D&C) for large-scale systems requires a specification that enables automation

CH2 Deployment notations to support cross-cutting concerns

- D&C is shared by various teams, including design, development, operations, and security
- Different technical levels of stakeholder proficiency must be considered in the development of D&C specifications

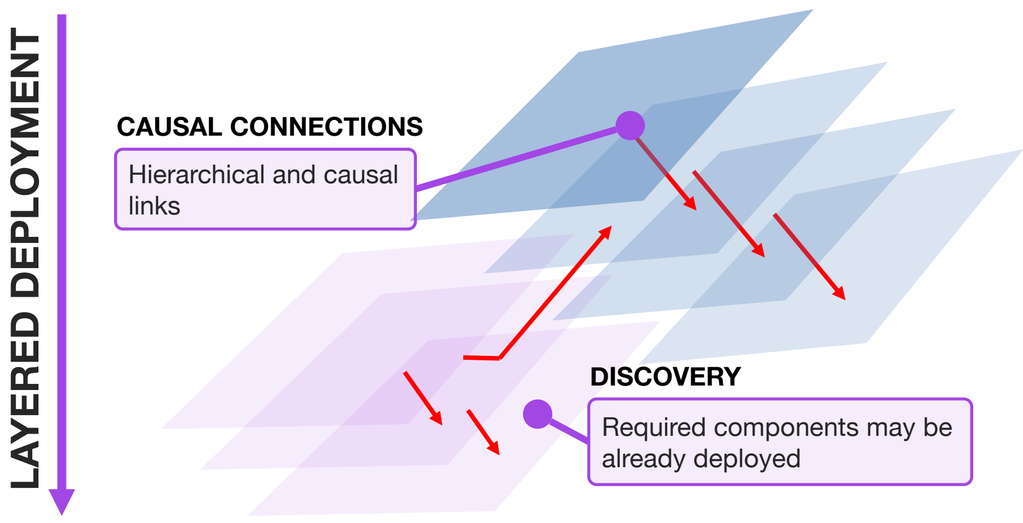
CH3 Notation and tool support for linking design and runtime deployment concepts

- Mapping between design and runtime deployment concepts is not direct anymore
- Causal connections among runtime models would support **change propagation** across different dimensions

CH4 Tool support for the evolution of deployment specifications and configuration management at runtime

- The dynamic nature of the cloud enables architectural agility, which should be supported by specification tools
- Deployment specifications should remain updated w.r.t the system
- Support for **assessment of different configurations** would aid decision making

PANORAMA: Continuous Deployment for Large-Scale Systems



- **Causally-connected models** at runtime realizing the deployment specifications
- Different views/perspectives on the system based on its deployment: software, hardware, network
- **Reuse of deployment specifications and automation**
- Collaboration among the actors involved in specification creation and evolution
- **Correspondence between specifications**, models, and deployed systems
- Standard mechanisms to realize continuous deployment

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