Facilitating Agile Prototyping of Cloud Applications
— A Model-Based Approach

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Preface

- **modeling** is used but in fact
  - it's all about **automation**!
- very **pragmatic** approach
  - no rocket science ☺
- use of **existing tools**, technologies, and methodologies
- fully relying on **open source**

Context: Complex Service Topologies
factors contributing to the complexity of cloud applications

❖scalability

❖security requirements

❖maintenance

➢generally **desirable** to increase complexity!

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Motivation: Development of Cloud Applications

- multiple roles involved
- development complex
  - consistent with service topology
- (re)deployment cumbersome
- changes costly
  - technical debts through avoidance

Challenges

- coordination needs among roles
- integration into service topology
  - of individual services
- automation
  - continuous deployment

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Model-Based Approach
## Two Domain-Specific Languages (DSLs) Involved

- **Provisioning DSL** [CloudMDE 2014, pp. 46–55]

  - for describing rudimentary service topologies

  - EA alignment: abstract $\rightarrow$ concrete building blocks

- **Coordination DSL** [EDOCW 2014, pp. 422–425]

  - synchronization of workspaces

  - preparation of configuration management (CM) modules

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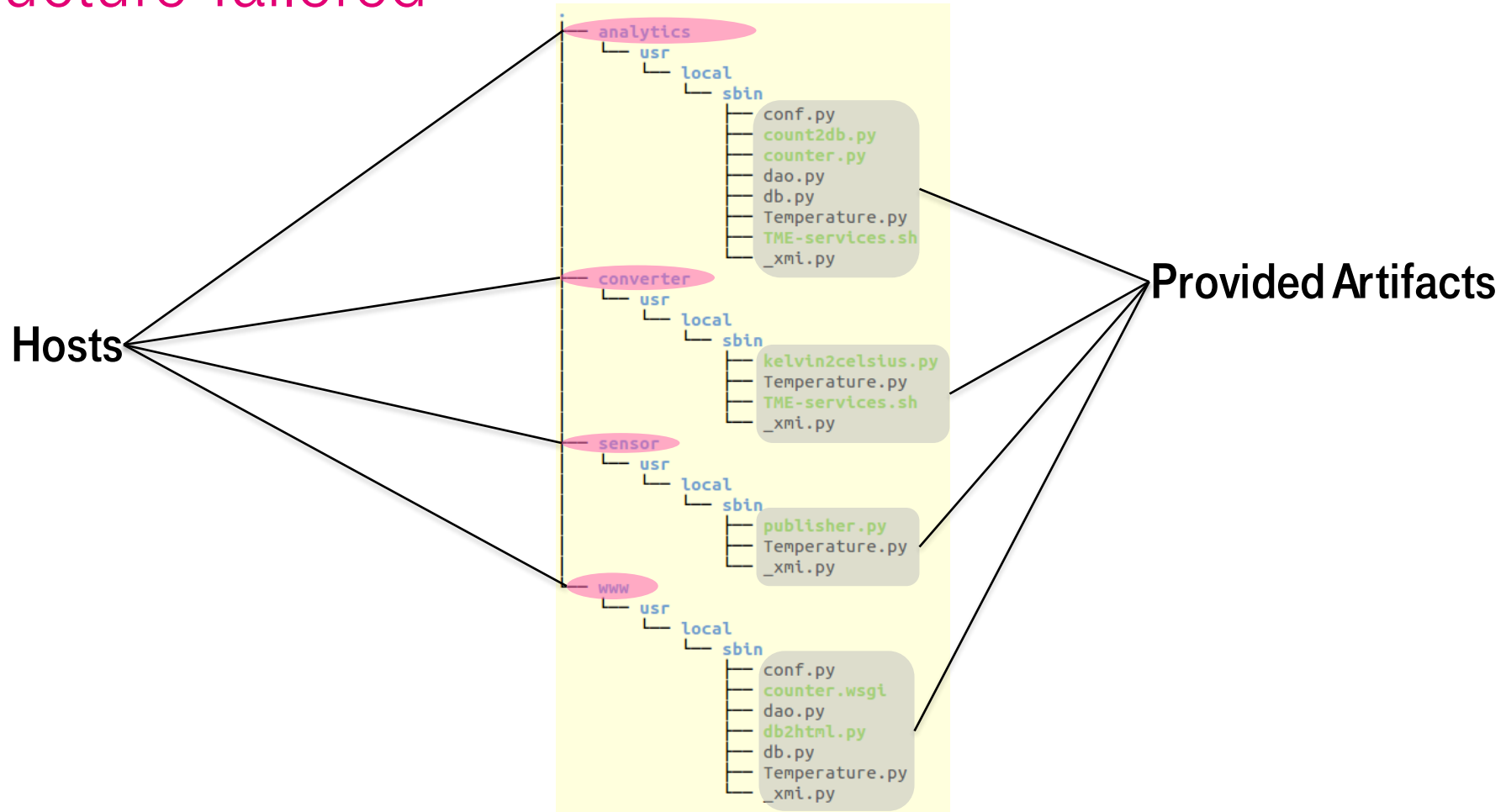# Relating Software Building Blocks to Infrastructure
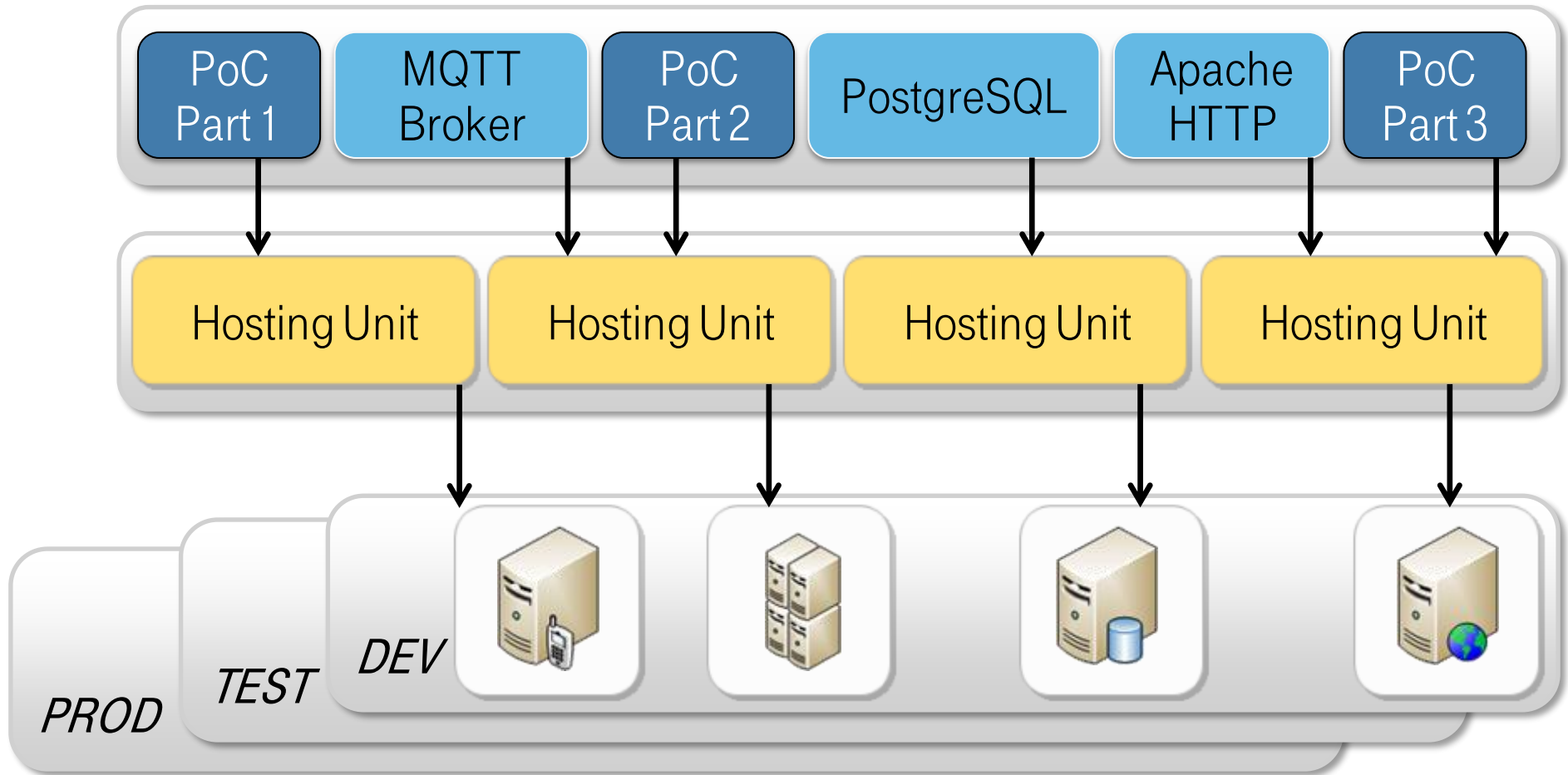
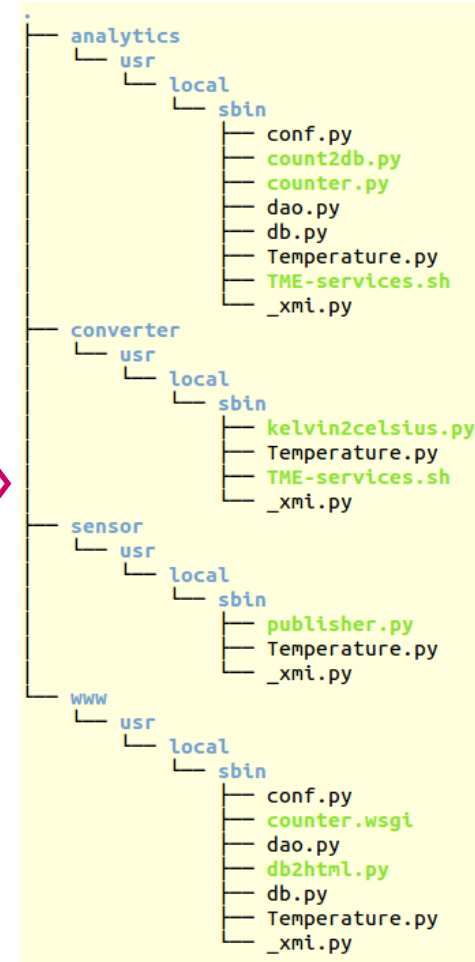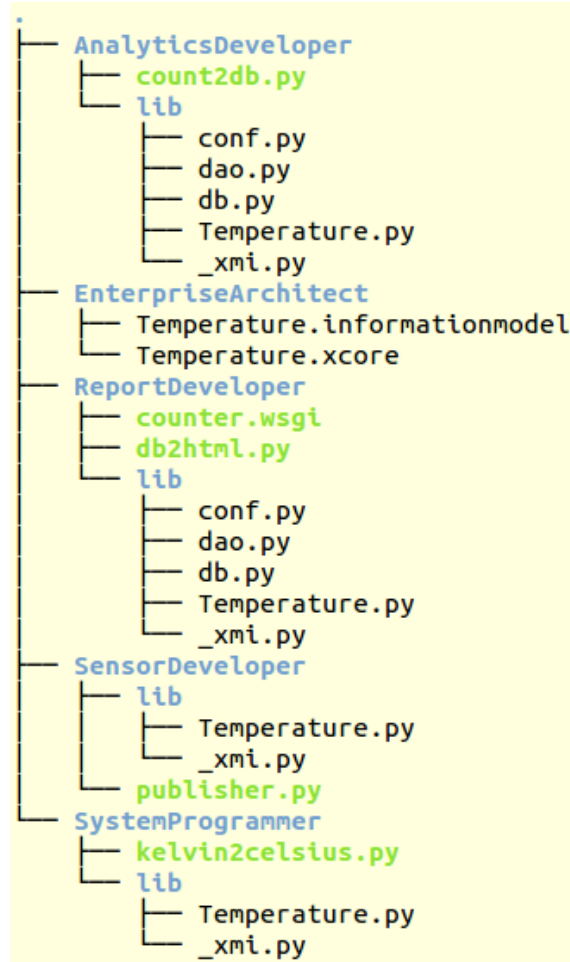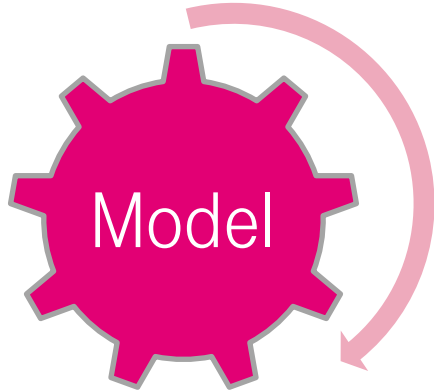# Coordination DSL: Synchronization of Workspaces
Role-Tailored
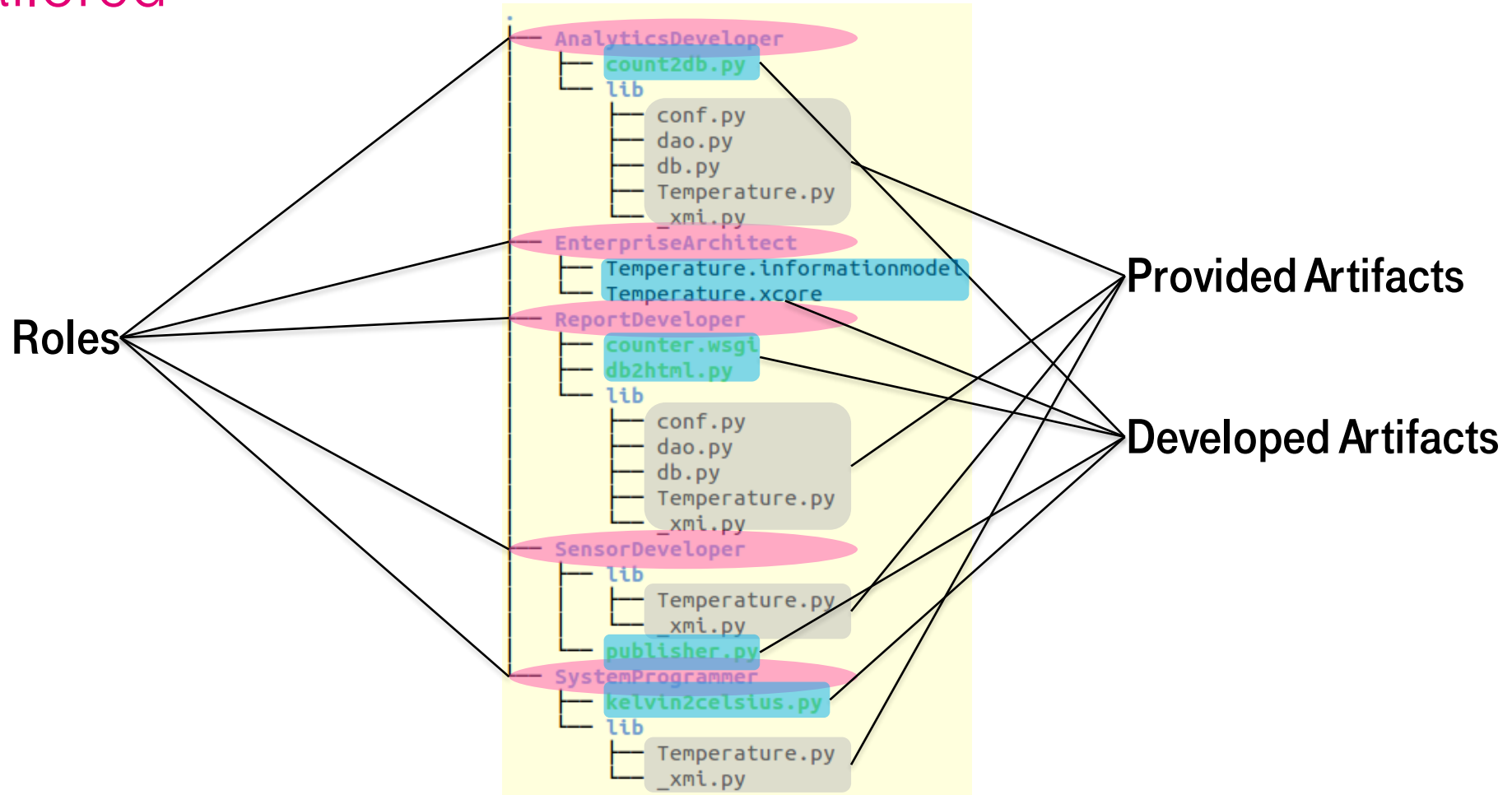
Coordination DSL: Preparation of Deployment
Infrastructure-Tailored

Automating the Continuous Deployment
Tool-Chain

Model → transform → transform → W7

```
.
├── AnalyticsDeveloper
│   ├── count2db.py
│   └── lib
│       ├── conf.py
│       ├── dao.py
│       ├── db.py
│       ├── Temperature.py
│       └── _xmi.py
├── EnterpriseArchitect
│   ├── Temperature.informationmodel
│   └── Temperature.xcore
├── ReportDeveloper
│   ├── counter.wsgi
│   ├── db2html.py
│   └── lib
│       ├── conf.py
│       ├── dao.py
│       ├── db.py
│       ├── Temperature.py
│       └── _xmi.py
├── SensorDeveloper
│   ├── lib
│   │   ├── Temperature.py
│   │   └── _xmi.py
│   └── publisher.py
└── SystemProgrammer
    ├── kelvin2celsius.py
    └── lib
        ├── Temperature.py
        └── _xmi.py
```

```
.
├── analytics
│   └── usr
│       └── local
│           └── sbin
│               ├── conf.py
│               ├── count2db.py
│               ├── counter.py
│               ├── dao.py
│               ├── db.py
│               ├── Temperature.py
│               ├── TME-services.sh
│               └── _xmi.py
├── converter
│   └── usr
│       └── local
│           └── sbin
│               ├── kelvin2celsius.py
│               ├── Temperature.py
│               ├── TME-services.sh
│               └── _xmi.py
├── sensor
│   └── usr
│       └── local
│           └── sbin
│               ├── publisher.py
│               ├── Temperature.py
│               └── _xmi.py
└── www
    └── usr
        └── local
            └── sbin
                ├── conf.py
                ├── counter.wsgi
                ├── dao.py
                ├── db2html.py
                ├── db.py
                ├── Temperature.py
                └── _xmi.py
```

Contributions

- **separation of concerns**
  - cloud architecture
  - service functionality
  - technology platforms (e.g., CM system; IaaS solution)
- overall automation for
  - facilitating **agile development** of cloud applications

Key Message

- **Model-Based Engineering**
  - facilitates separation of concerns
  - enables direct stakeholder participation
  - brings automation; permits fast iteration cycles

  - ➤ **highly feasible for the development of cloud applications**

Invitation

THANK YOU!

QUESTIONS?

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