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HOT UPDATES WITH PROGRAMMING HINTS

Hot Updates With Programming Hints

Goal

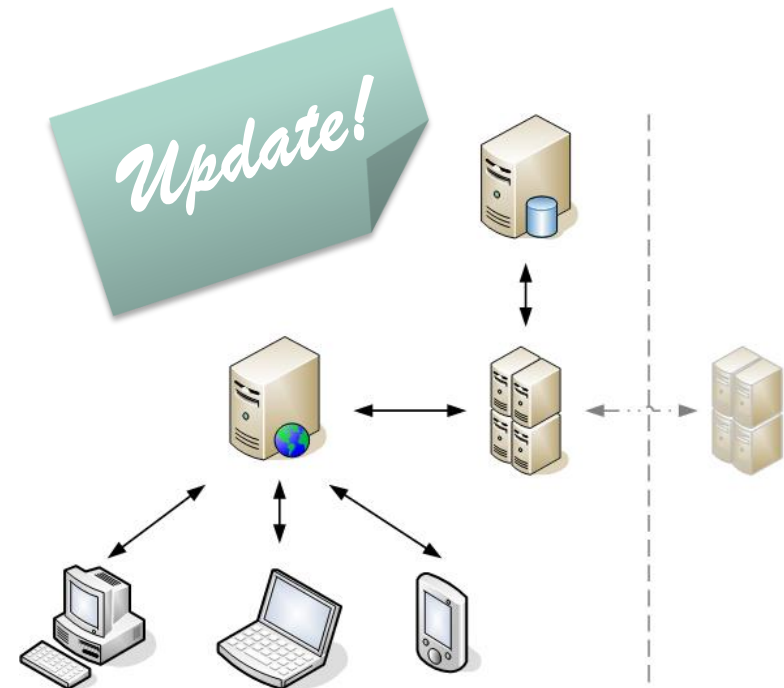
- Keep distributed (business) systems up-to-date while they are running

System Challenges

- Heterogeneous systems
 - Legacy, current, and future
- **Distributed system**
- Multi-tenancy
- **High-availability required (soft realtime)**
 - **Short duration, low cost**
- **Transactional processing**

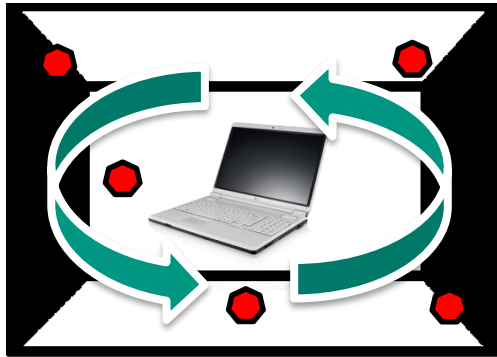
Reason: Evolution

- Bug fixes, security patches
- Modified, new features
- Modified, new corporate regulations, state laws, ...

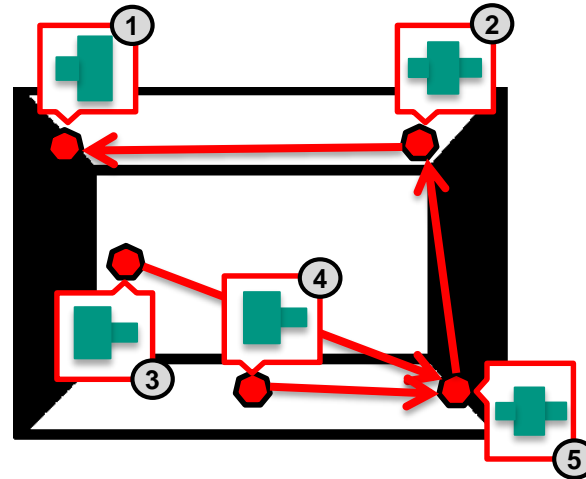


Planning and Deploying Dynamic Software Updates in Distributed Systems

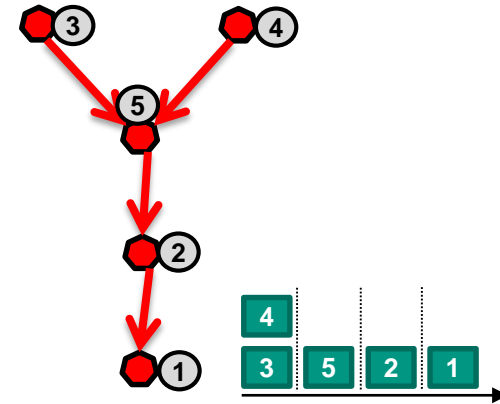
Planning



Discovery

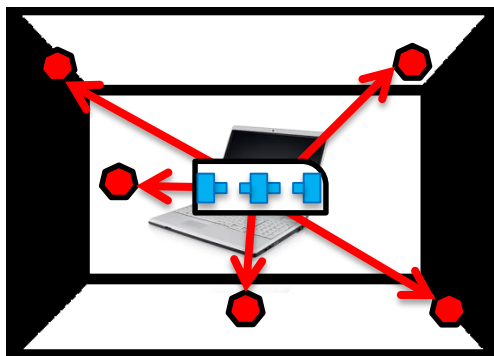


Dependency Identification

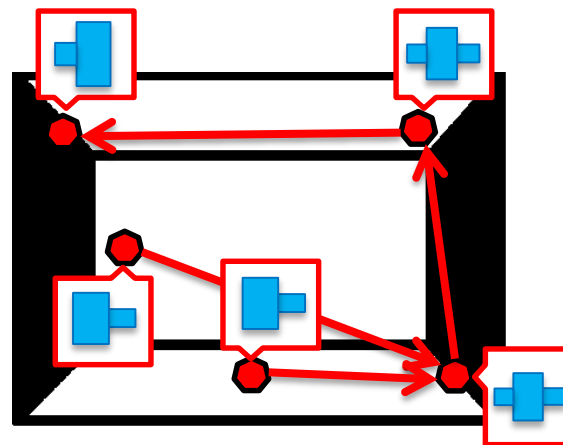


Planning: Update and Re-Activation

Deployment



Deployment



Re-Activation

Dependencies

- Virtual system
 - Network, programs
- Physical system
 - Sensors, actuators

Goals

- Min. duration

Constraints

- QoS (virtual, physical)

Hot Updates With Programming Hints

Problem

- **When** is your code ready for instantaneous change?

Approach

- Programmer formulates **update safety conditions** on code modules

Goals

- Enable „**instantaneous**“ **exchange** of **a** code module
- Enable **coordinated exchange** of **many** code modules
- Modules are native elements of standard languages
 - Classes, packages, functions ...
 - Extend existing software projects

Adress 3 Scenarios

- Replace **one** module on **one** system
- Replace **many** modules on **one** system
- Replace **many** modules on **many** systems

Projektgruppe

- Evaluate the opportunities of safety conditions in Java-based software systems using **profiling**