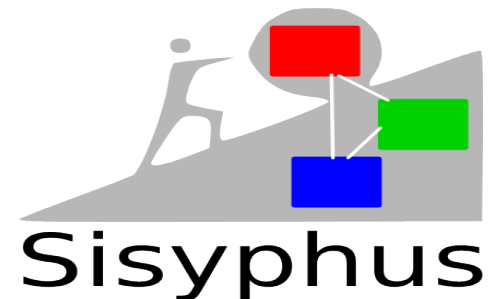


The Sisyphus Continuous Integration & Release System

Tijs van der Storm

Centrum voor Wiskunde en Informatica

storm@cwi.nl



Introduction

- Me: Tijs van der Storm
 - Phd in november 2007
 - Post-doc (CWI) / teacher (UvA)
 - Today: Sisyphus
-

Roadmap

- Introducing Sisyphus
 - Incremental integration
 - Backtracking integration
 - Implementation
 - Conclusion
-

Background

- ASF+SDF Meta-Environment
 - Around 70 components (currently)
 - Release was a manual, painful process
 - syncing dependencies and versions
 - Daily build too coarse-grained
 - build problems hard to fix
 - => Sisyphus
-

Continuous release

- From CI to *continuous release*
 - every successful build is released
 - bill of materials (BOM) accurately tracked
 - opportunity for *continuous updates*
 - Similar to Nix, only:
 - less focus on deployment
 - more focus on release
 - simpler
-

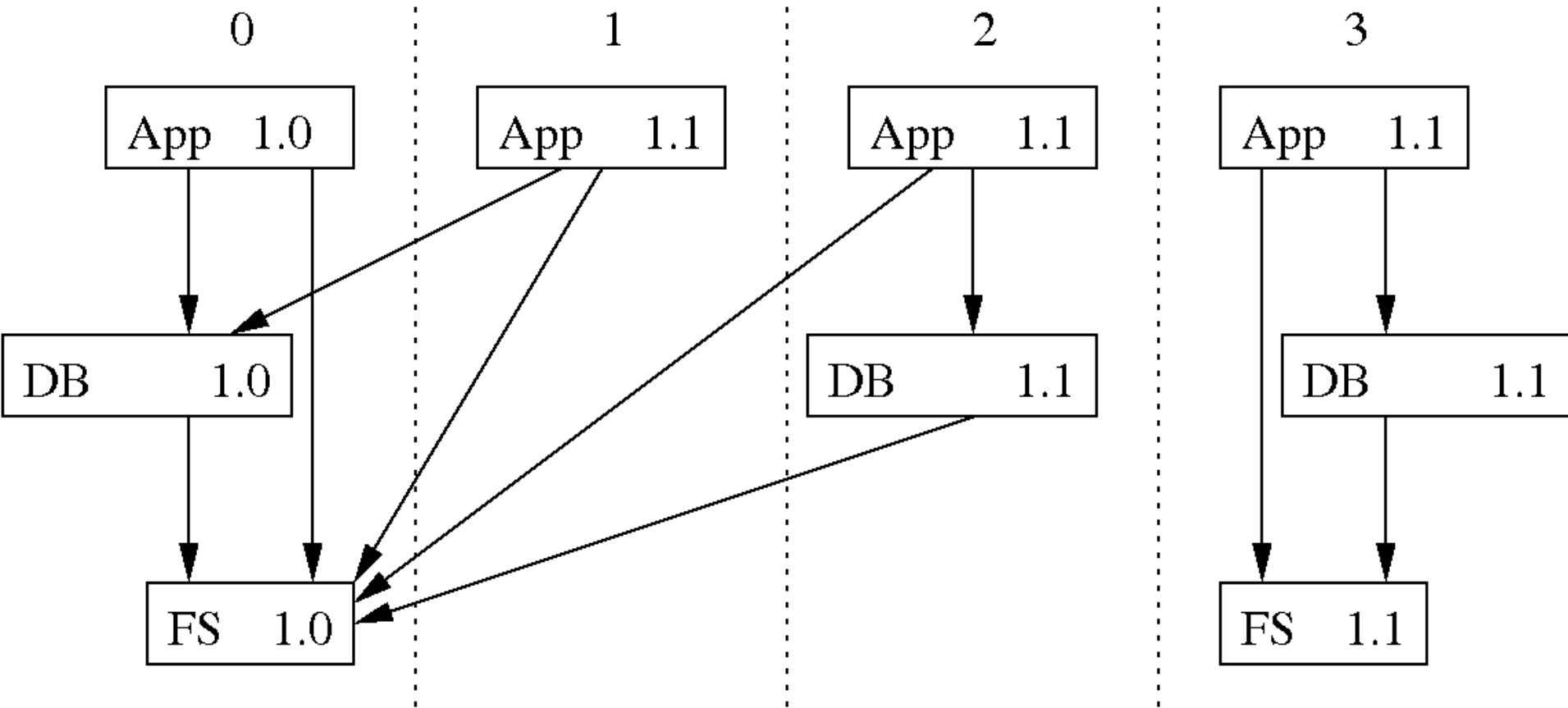
Sisyphus' features

- Component-based
 - to allow CBSE/reuse/variation
 - Incremental
 - to prevent redundant builds
 - Backtracking
 - to mitigate the ripple effect of failure
 - Bills of materials
 - to allow automatic release
-

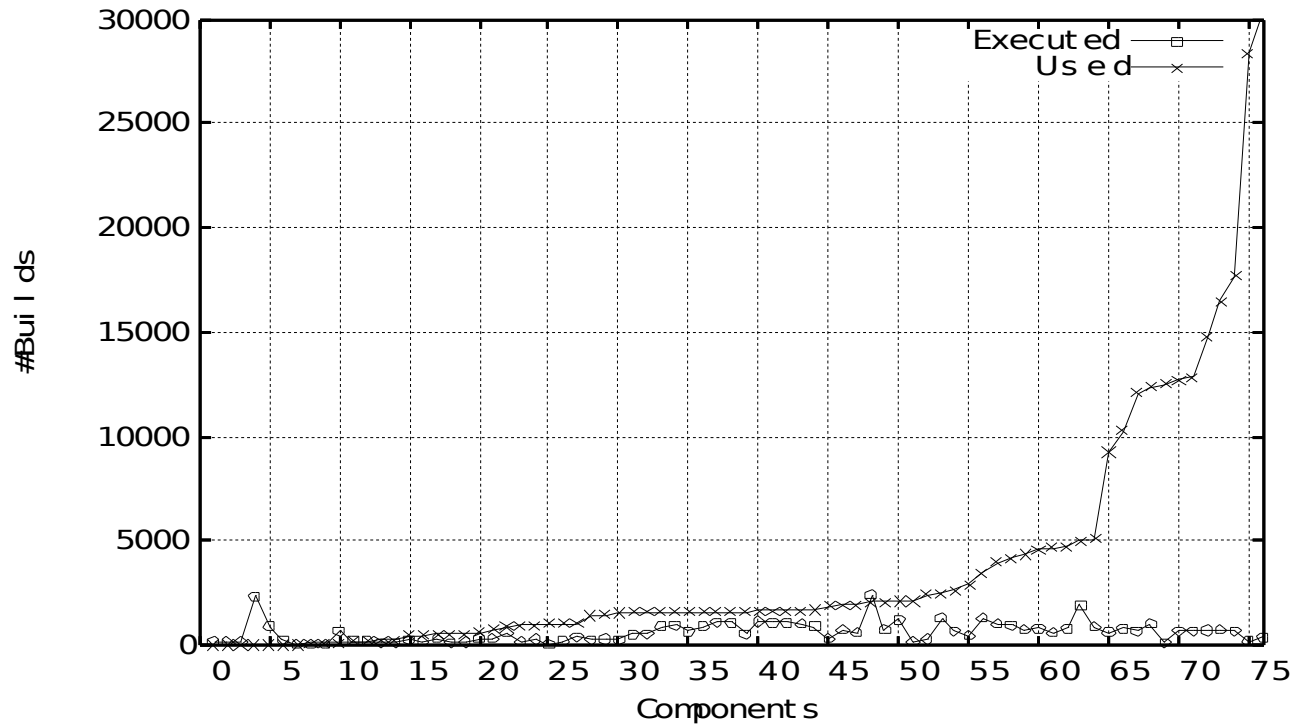
Incremental integration

- Determine affected components
 - components with changes
 - their co-dependencies
 - Build & test in topological order
 - when *A requires B*
 - build *B* before *A*
 - Reuse earlier builds of unaffected components
-

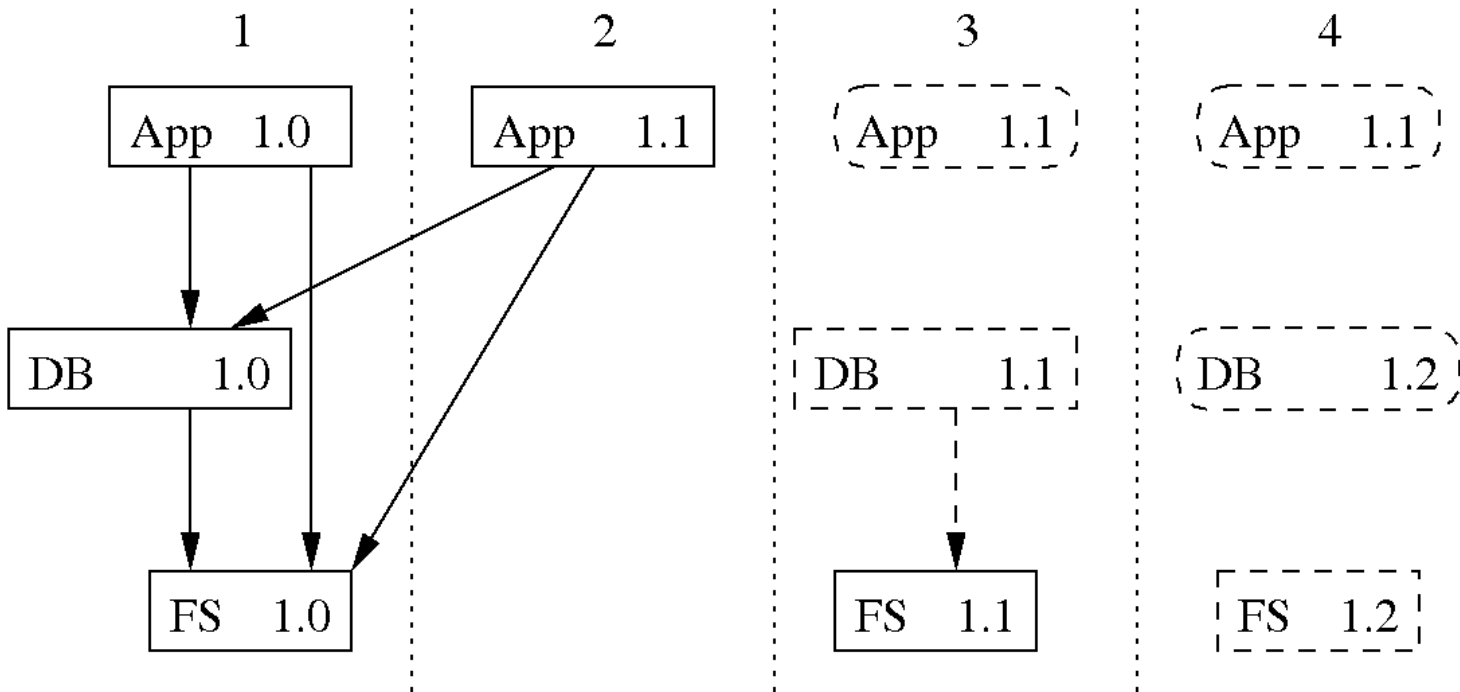
Incremental Integration



Build sharing (since 12-2005)



Failing builds



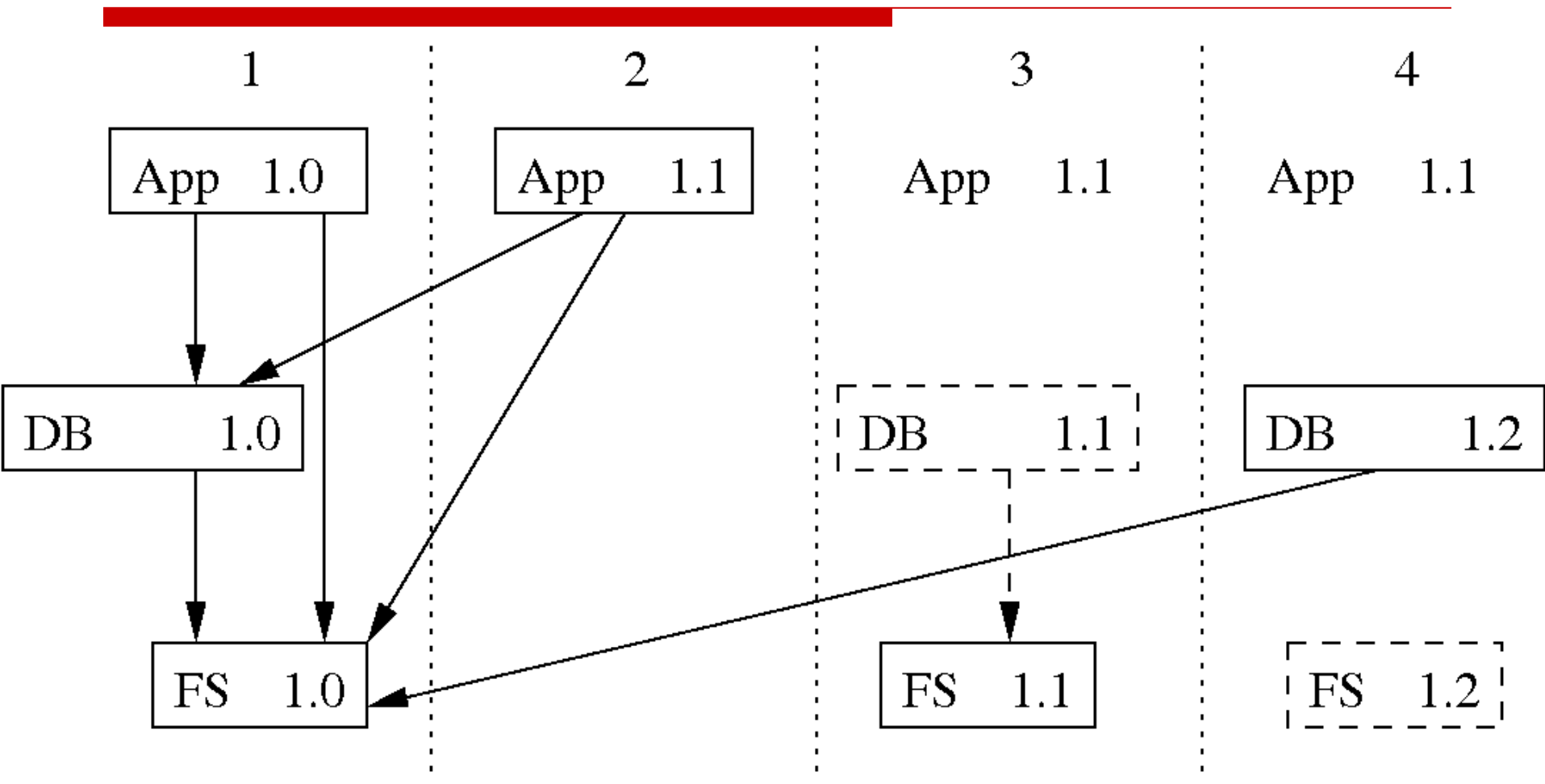
Backtracking

- Build failure ripple effect
 - lower components that fail prevent **all** higher components to be built
 - yet the higher components might have changes that require integration
 - “**A** build is better than **no** build”
 - feedback
 - release opportunity
 - => backtracking
-

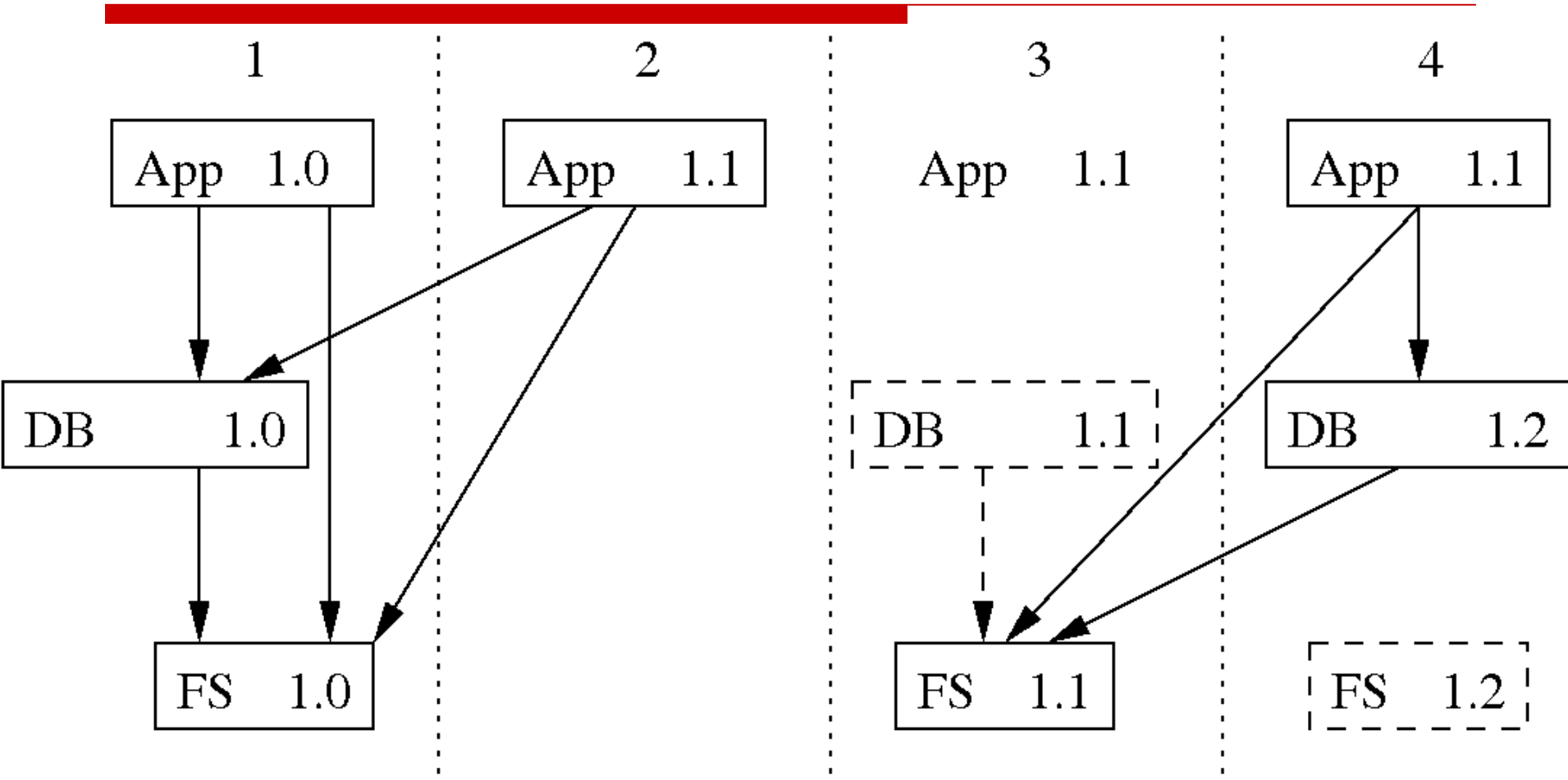
Backtracking in Sisyphus

- Persistently store all built artifacts
 - If a dependency build has failed
 - search for suitable **older** builds
 - build against those dependencies
 - Two types of backtracking:
 - simple (currently in use)
 - true (prototype)
-

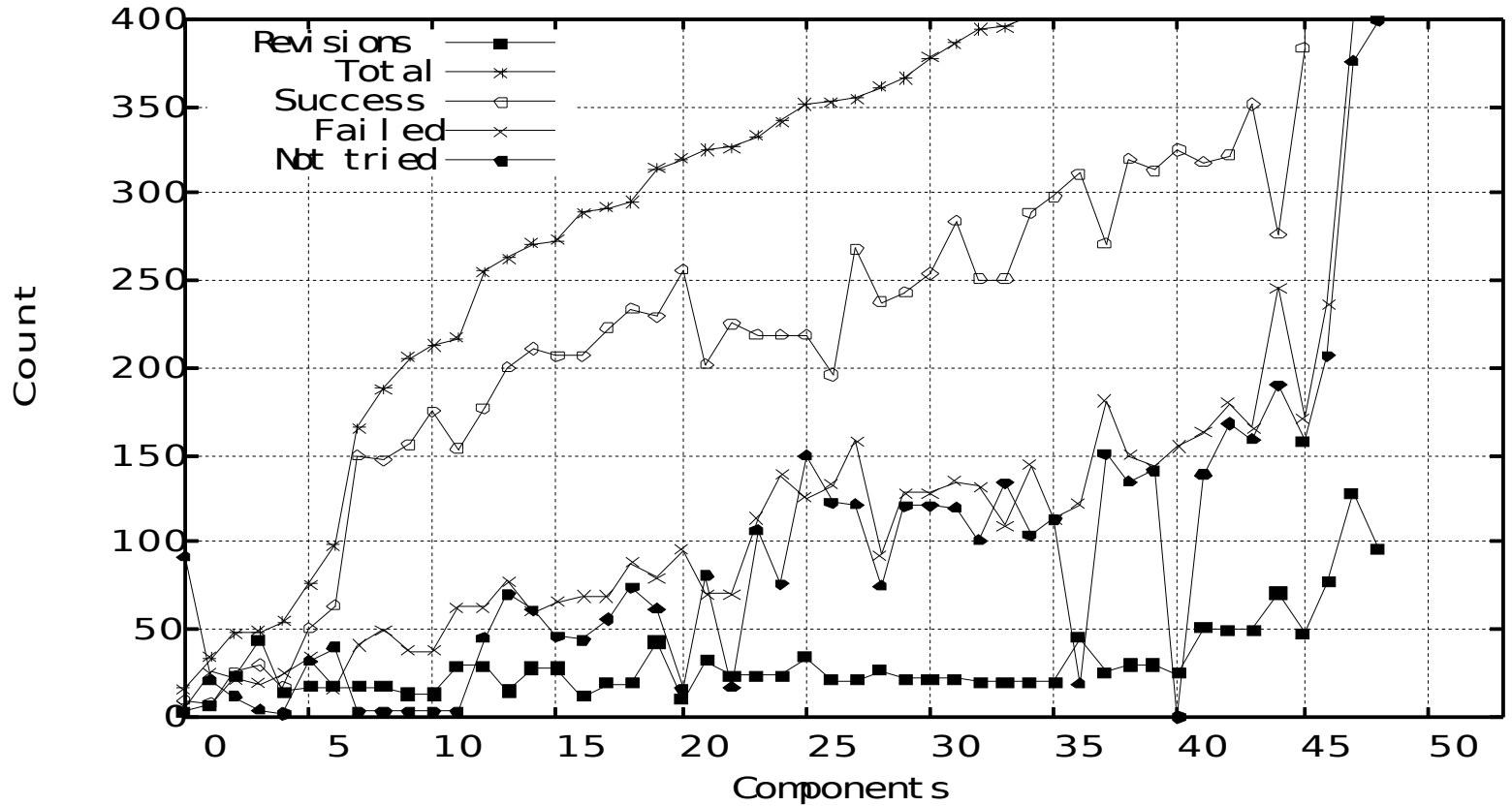
Simple backtracking



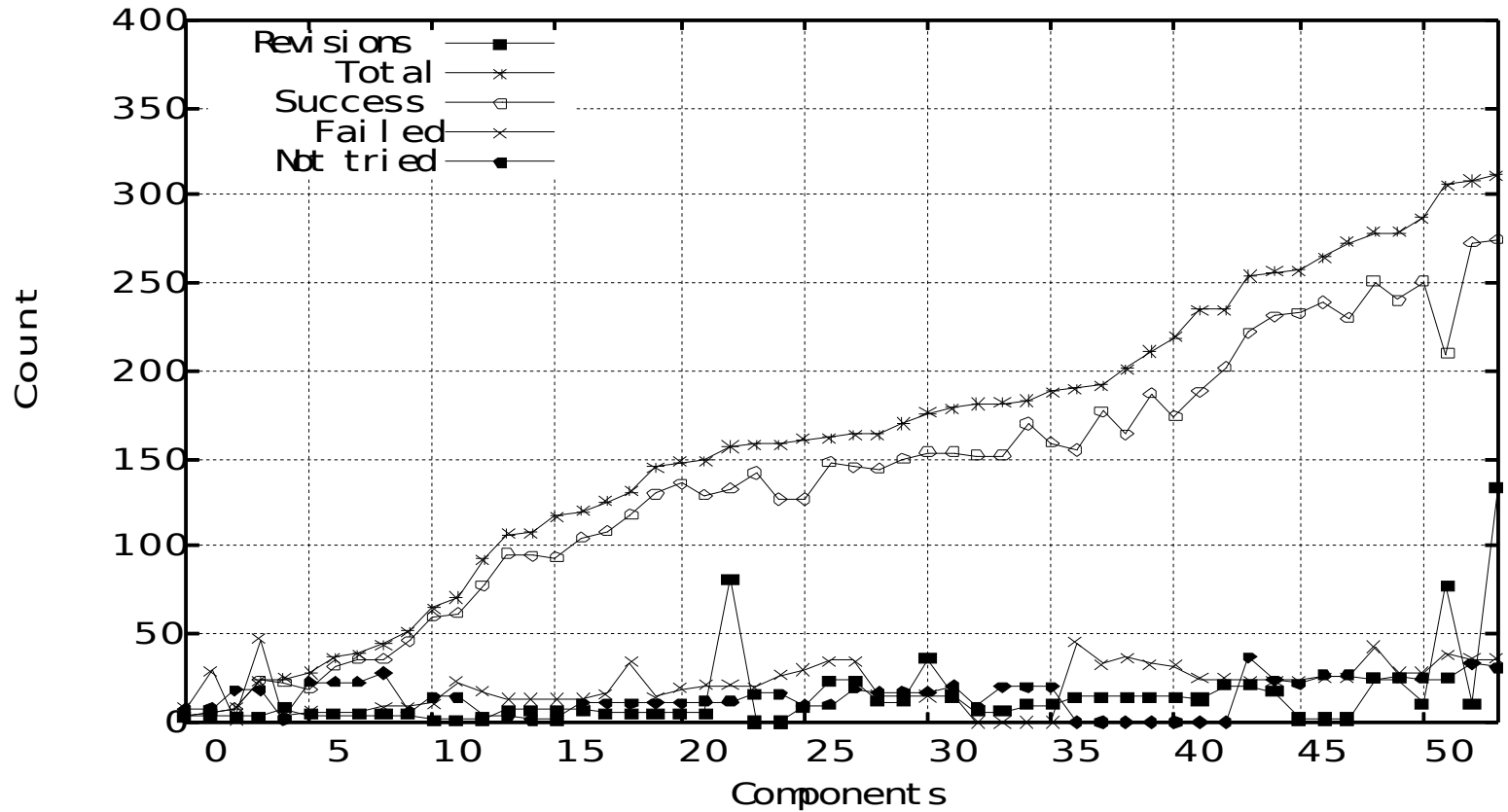
True backtracking



No backtracking (32 weeks)



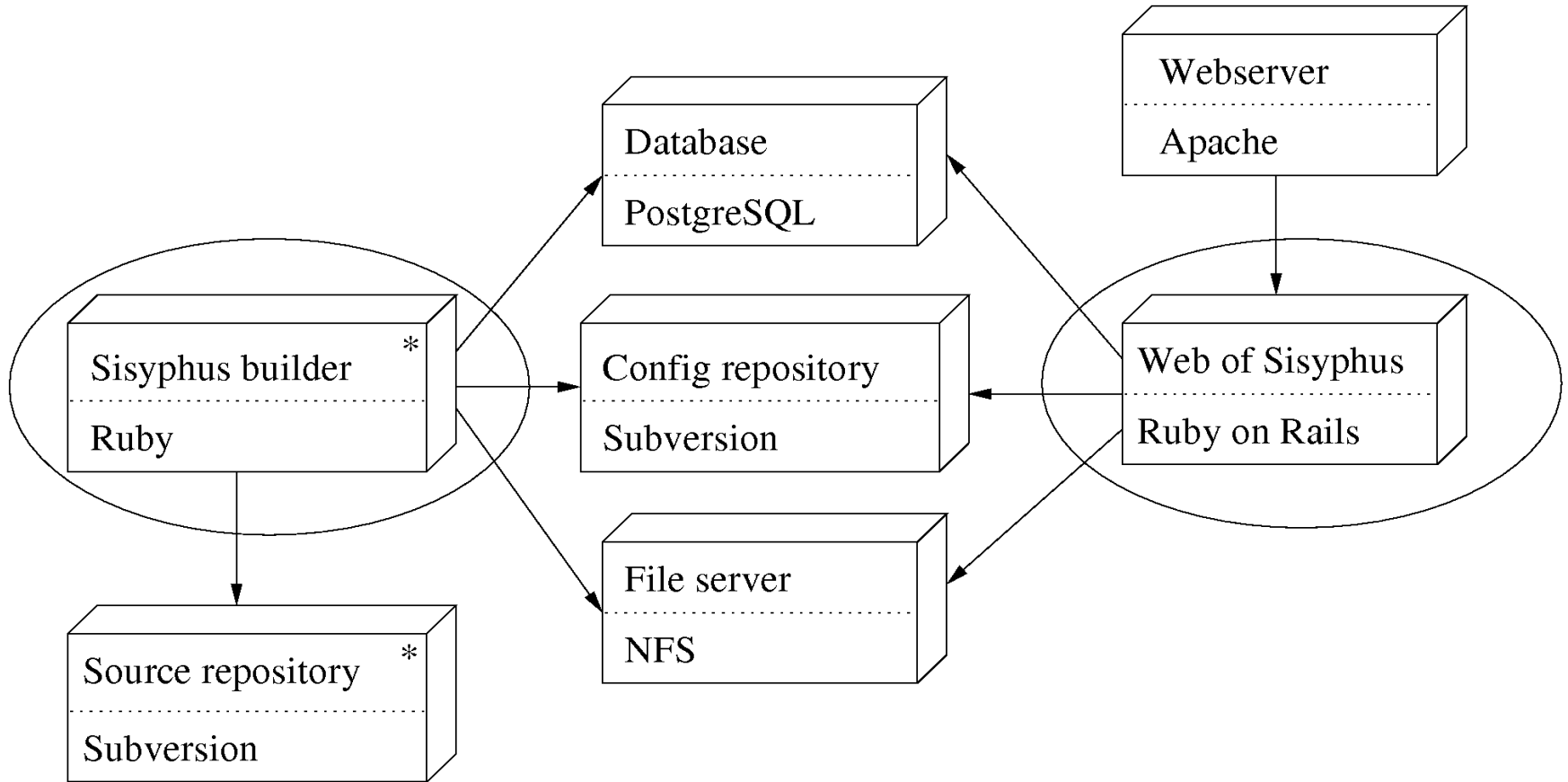
Simple backtracking (32 weeks)



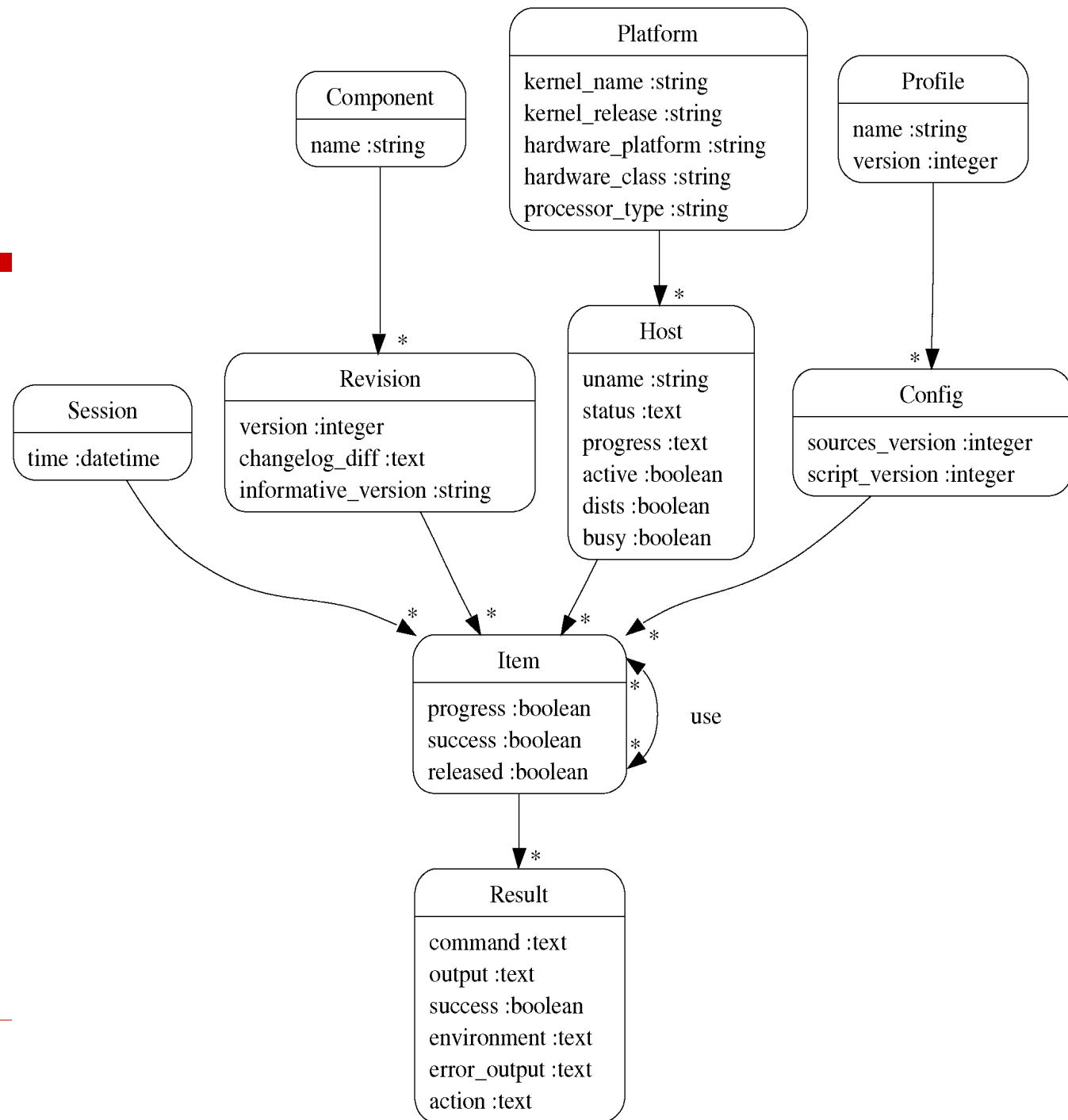
Implementation overview

- Builders (one per host)
 - Database (bills of materials)
 - Configuration repository
 - settings per builder
 - specification of component locations
 - specification of build steps and templates
 - Web application (front-end)
-

Deployment architecture



BOM Model



Web of Sisyphus

- Results are published on the web
 - Real-time builder status
 - Full logs of builds
 - Bill of materials
 - Dependency information
 - Builder settings
 - Release information
 - Source & binary distributions
-

W

Web of Sisyphus - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

Web of Sisyphus

Builds Sessions Packages Hosts Logs Sisyphus Statistics

apps.cwi.nl joustra.sen.cwi.nl winkelhaak.sen.cwi.nl

Menu

- Home

Status

- Builds
- Sessions
- Packages
- Hosts**
- Logs
- Sisyphus

Configuration

- Profiles
- Sources
- Script

Comments

Comments and constructive criticisms are welcome [via email](#).

Package	apps.cwi.nl	joustra.sen.cwi.nl	winkelhaak.sen.cwi.nl
JJTraveler	success 16:56 11/06	success 16:16 11/06	success 11:40 15/10
JReIcal		success 16:16 11/06	
apigen	success 16:56 11/06	success 16:16 11/06	success 15:56 12/11
asc-support	not tried 16:56 11/06	success 16:16 11/06	success 14:35 13/11
asf	not tried 09:24 12/06	failed 09:20 12/06	success 14:35 13/11
asf-library	success 09:24 12/06	success 09:20 12/06	success 12:00 13/11
asf-support	not tried 16:56 11/06	success 16:16 11/06	success 10:07 26/10
asfsdf-meta	not tried 16:56 11/06	success 09:20 12/06	success 15:56 12/11
aterm	failed 16:56 11/06	success 16:16 11/06	success 11:40 15/10
aterm-java	success 16:56 11/06	success 16:16 11/06	success 15:00 17/11
balanced-binary-aterms		success 16:16 11/06	
c-library	success 16:56 11/06	success 16:16 11/06	
config-manager	not tried 16:56 11/06	success 16:16 11/06	success 14:22 31/10
config-support	success 16:56 11/06	success 16:16 11/06	success 14:22 31/10
console-grabber	failed 16:56 11/06	success 16:16 11/06	
console-gui	failed 16:56 11/06	success 16:16 11/06	
dialog-gui	success 16:56 11/06	success 16:16 11/06	success 15:00 17/11
editor-manager	not tried 16:56 11/06	success 16:16 11/06	success 10:07 26/10
editor-plugin	not tried 16:56 11/06	success 16:16 11/06	success 15:00 17/11
error-gui	not tried 16:56 11/06	success 16:16 11/06	success 15:00 17/11
error-support	not tried 16:56 11/06	success 16:16 11/06	success 10:07 26/10
graph-gui	not tried 16:56 11/06	success 16:16 11/06	success 15:00 17/11
graph-support	not tried 16:56 11/06	success 16:16 11/06	success 10:07 26/10
io-support	not tried 16:56 11/06	success 16:16 11/06	success 14:22 31/10
meta	not tried 16:56 11/06	success 16:16 11/06	success 15:00 17/11
meta-autotools	success 16:50 30/05	success 15:17 30/05	success 11:40 15/10

Recent builds

asf-library: success
apps.cwi.nl at [09:24 12/06](#)

asfsdf-meta: success
joustra.sen.cwi.nl at [09:20 12/06](#)

sdf-meta: success
joustra.sen.cwi.nl at [09:20 12/06](#)

asf-library: success
joustra.sen.cwi.nl at [09:20 12/06](#)

asf: failed
joustra.sen.cwi.nl at [09:20 12/06](#)

meta-doc: failed
apps.cwi.nl at [16:56 11/06](#)

sdf-apigen: success
apps.cwi.nl at [16:56 11/06](#)

apigen: success
apps.cwi.nl at [16:56 11/06](#)

tunit: failed
apps.cwi.nl at [16:56 11/06](#)

sdf-pretty: success
apps.cwi.nl at [16:56 11/06](#)

[RSS](#)

[More builds...](#)

http://sisyphus.sen.cwi.nl:8080/hosts

Web of Sisyphus

Builds Sessions Packages Hosts Logs Sisyphus Statistics**Menu**[Home](#)**Status**[Builds](#)[Sessions](#)[Packages](#)[Hosts](#)[Logs](#)[Sisyphus](#)**Configuration**[Profiles](#)[Sources](#)[Script](#)**Comments**

Comments and constructive criticisms are welcome [via email](#).

Done

Build information

Component	asfsdf-meta
Revision	22939
Result	success
Session	09:20 12/06/2007 (messages)
Host	joustra.sen.cwi.nl
Profile	joustra version 254 view
Sources version	262
Script version	253
Earlier builds:	36739 36721 36648 36580 36530 36519 36505 36491 36479 36465
Distribution:	asfsdf-meta-2.0.1RC2pre.22939.36783.tar.gz
Bundle	asfsdf-meta-bundle-2.0.1RC2pre.22939.36783.tar.gz
Binary	asfsdf-meta-2.0.1RC2pre.22939.36783.bin.sh

Actions

reconf	success
configure	success
make	success
install	success
check	success
doc	success
distcheck	success
pathcheck	success
overlapcheck	success
bindist	success

Recent builds**asf-library: success**apps.cwi.nl at [09:24](#)
[12/06](#)**asfsdf-meta: success**joustra.sen.cwi.nl at [09:20](#)
[12/06](#)**sdf-meta: success**joustra.sen.cwi.nl at [09:20](#)
[12/06](#)**asf-library: success**joustra.sen.cwi.nl at [09:20](#)
[12/06](#)**asf: failed**joustra.sen.cwi.nl at [09:20](#)
[12/06](#)**meta-doc: failed**apps.cwi.nl at [16:56](#)
[11/06](#)**sdf-apigen: success**apps.cwi.nl at [16:56](#)
[11/06](#)**apigen: success**apps.cwi.nl at [16:56](#)
[11/06](#)

Web of Sisyphus

[Builds](#) [Sessions](#) [Packages](#) [Hosts](#) [Logs](#) [Sisyphus](#) [Statistics](#)

Menu

[Home](#)

Status

[Builds](#)[Sessions](#)[Packages](#)[Hosts](#)[Logs](#)[Sisyphus](#)

Configuration

[Profiles](#)[Sources](#)[Script](#)

Comments

Comments and constructive criticisms are welcome [via email](#).

Build information

Component [asf](#)
 Revision [22994](#)
 Result **failed**
 Session [09:20 12/06/2007 \(messages\)](#)
 Host [joustra.sen.cwi.nl](#)
 Profile [joustra version 254 \[view\]\(#\)](#)
 Sources version [262](#)
 Script version [253](#)
 Earlier builds: [36735](#) [36663](#) [36546](#) [36523](#) [36510](#) [36494](#) [36482](#) [36470](#) [36461](#) [36458](#)

Actions

[reconf](#) **success**
[configure](#) **success**
[make](#) **success**
[install](#) **success**
[check](#) **failed**

Dependencies

- ◆ [Dependency graph](#)
- ◆ [Reduced dependency graph](#)

Component	Revision	Status	Session	
meta-autotools	20184	success	15:17 30/05/2007	Details
meta-build-env	22977	success	16:16 11/06/2007	Details
aterm	22965	success	16:16 11/06/2007	Details
toolbuslib	22685	success	16:16 11/06/2007	Details
error-support	22691	success	16:16 11/06/2007	Details
pt-support	22881	success	16:16 11/06/2007	Details
asf-support	22874	success	16:16 11/06/2007	Details
ptable-support	22693	success	16:16 11/06/2007	Details
tide-support	22713	success	16:16 11/06/2007	Details
...

Recent builds

asf-library: success
[apps.cwi.nl](#) at [09:24 12/06](#)

asfsdf-meta: success
[joustra.sen.cwi.nl](#) at [09:20 12/06](#)

sdf-meta: success
[joustra.sen.cwi.nl](#) at [09:20 12/06](#)

asf-library: success
[joustra.sen.cwi.nl](#) at [09:20 12/06](#)

asf: failed
[joustra.sen.cwi.nl](#) at [09:20 12/06](#)

meta-doc: failed
[apps.cwi.nl](#) at [16:56 11/06](#)

sdf-apigen: success
[apps.cwi.nl](#) at [16:56 11/06](#)

apigen: success
[apps.cwi.nl](#) at [16:56 11/06](#)

tunit: failed
[apps.cwi.nl](#) at [16:56 11/06](#)

sdf-pretty: success
[apps.cwi.nl](#) at [16:56 11/06](#)

[RSS](#)

Conclusion

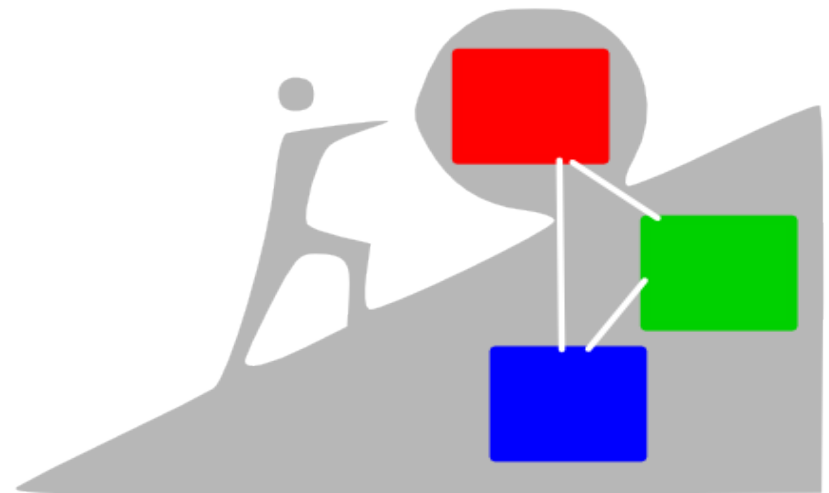
- Sisyphus
 - continuous integration
 - continuous release
 - Key features:
 - incremental integration
 - backtracking integration
 - More info:
 - Backtracking Incremental Continuous Integration (to appear, CSMR'08)
-

Directions for further research

- Support for multiple branch configurations
 - Decentralized integration
 - multiple repositories
 - multiple integration sites
-

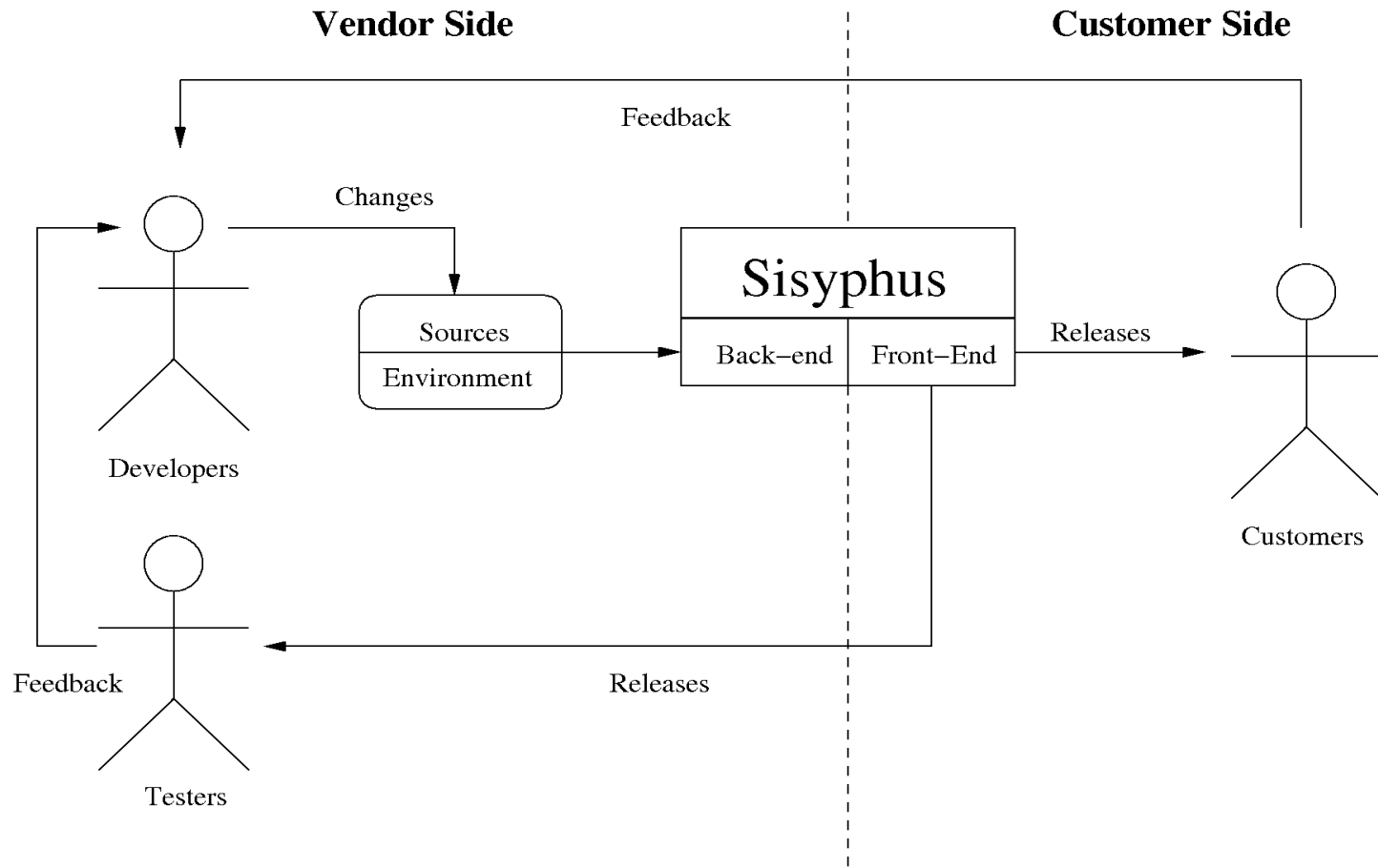
Thank you

Questions?



Sisyphus

Overview of Sisyphus



Continuous Integration (CI)

- Best practice (?)
 - frequent committing of changes
 - after commit, do a clean build
 - then run all tests
 - *Heartbeat of software development*
 - If the build breaks, fixing it is top priority
 - Anti-practice: *big bang integration*
-

Why continuous integration?

- It's all about feedback
 - *global* effects of *local* changes
 - Early discovery of problems
 - minimize interaction between changes
 - prevent *integration hell*
 - Centralized source of knowledge
 - Always a working version
-