NICOS System of Nightly Builds for Distributed Development

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Purpose of NICOS

- NIghtly COntrol System
- Provide flexible nightly build system for coordination of distributed development
- Test new software submissions
- Send immediate feedback to developers
- Facilitate multi-person, multi-platform development of code
- Ensure maximum stability of build processes

Flexible Build System

- Based on experience gained in software management of large HEP projects (CLEO, ATLAS)

- Operates on UNIX-like platforms (adaptation for Windows is planned)

- Works with popular release tools (CMT, SCRAM, SRT)

- Provides options for version management

- Allows optional number of releases in a cycle

Software Testing

- Unit tests supported by release tools
  - Success is determined by the return value of a test
- Integrated tests defined at NICOS configuration. Success criteria:
  - Critical patterns in the output
  - Comparison of histograms (under development)

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Informing Developers

- NICOS dynamic web pages
  - Detailed status of builds is displayed on the project web page
  - Build summary web pages display results for individual packages and integrated tests
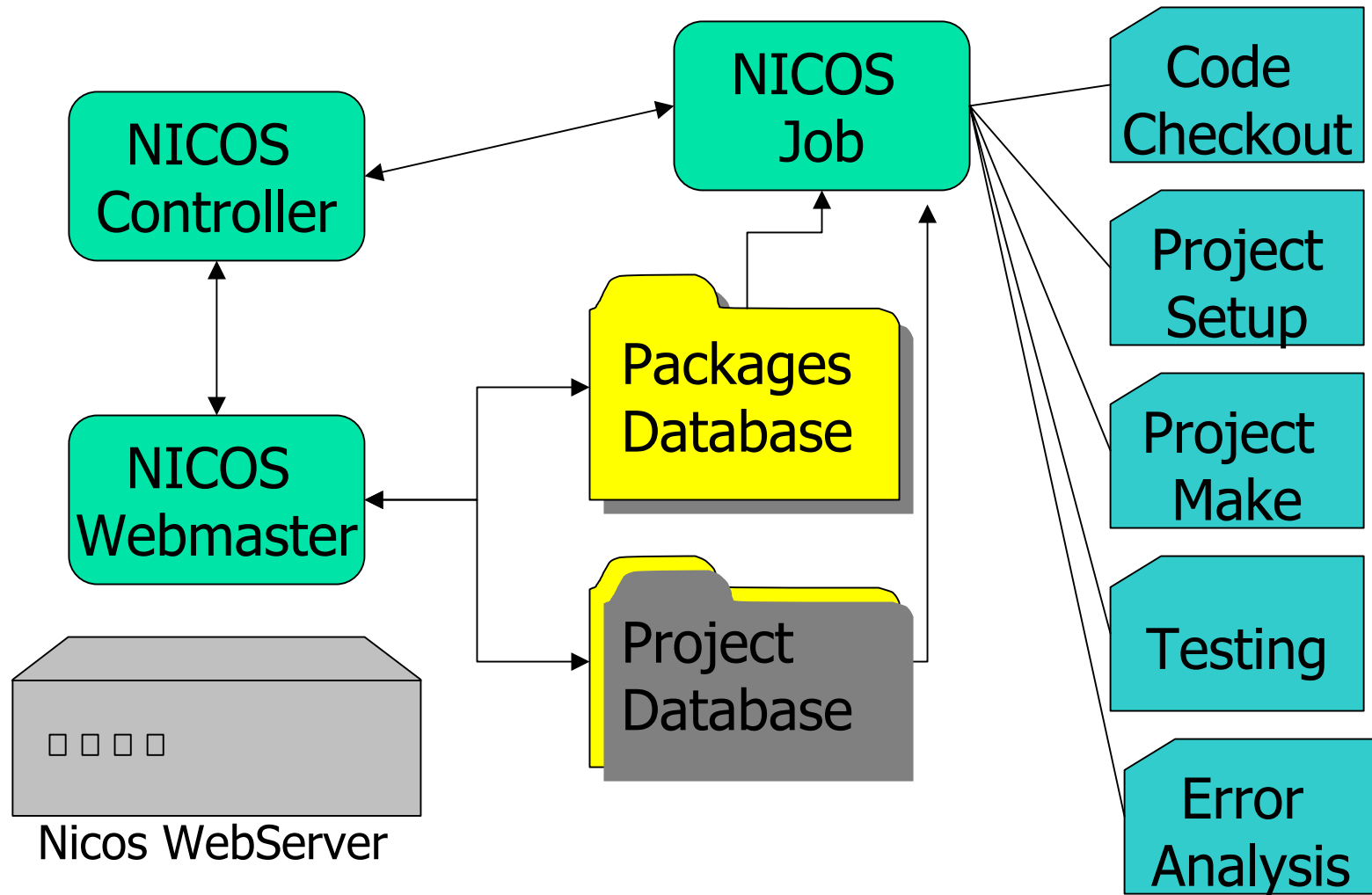- Responsible developers are notified about problems via e-mail

Stability of builds

- Build process is divided into steps
  - Current step is displayed on the project web page
  - If any step fails, NICOS Controller tries to restart from the point of failure
- Time limits are imposed for execution of steps
  - NICOS job can be automatically killed if runs overtime

NICOS Organization

NICOS Controller

NICOS Webmaster

Nicos WebServer

NICOS Job

Packages Database

Project Database

Code Checkout

Project Setup

Project Make

Testing

Error Analysis

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NICOS Project Database

- XML-like file with configuration parameters
- Each build step is associated with Markup tag
- Markup tag with parameters is followed by commands for particular step

```
<project build dir=src>
scram b
<error analysis>
NICOS_MAIL="no"
```

NICOS Packages Database

- Names of packages
- Method of CVS tag selection (for each package)
  - Exact tag
  - Latest CVS tag
  - Latest CVS tag with restrictions (e.g. starting with some string)
  - External script
- Addresses of responsible developers

NICOS Web Server

(available in 0.2 version of NICOS)

- Based on PHP scripts
- Version Administrator
  - Change conventions for tag selections
  - Change e-mail addresses of developers
  - Add/Delete packages
- Project Configurator
  - Configure project from internet
- NICOS Job Controller (in 0.3 version of NICOS)
  - Show status of builds, stop/start builds
- All actions require admin privileges

NICOS Web Pages

Project Configuration Page

Project Configurator

NICOS Version Administrator

NICOS Project Page

Build Results

NICOS Job Controller

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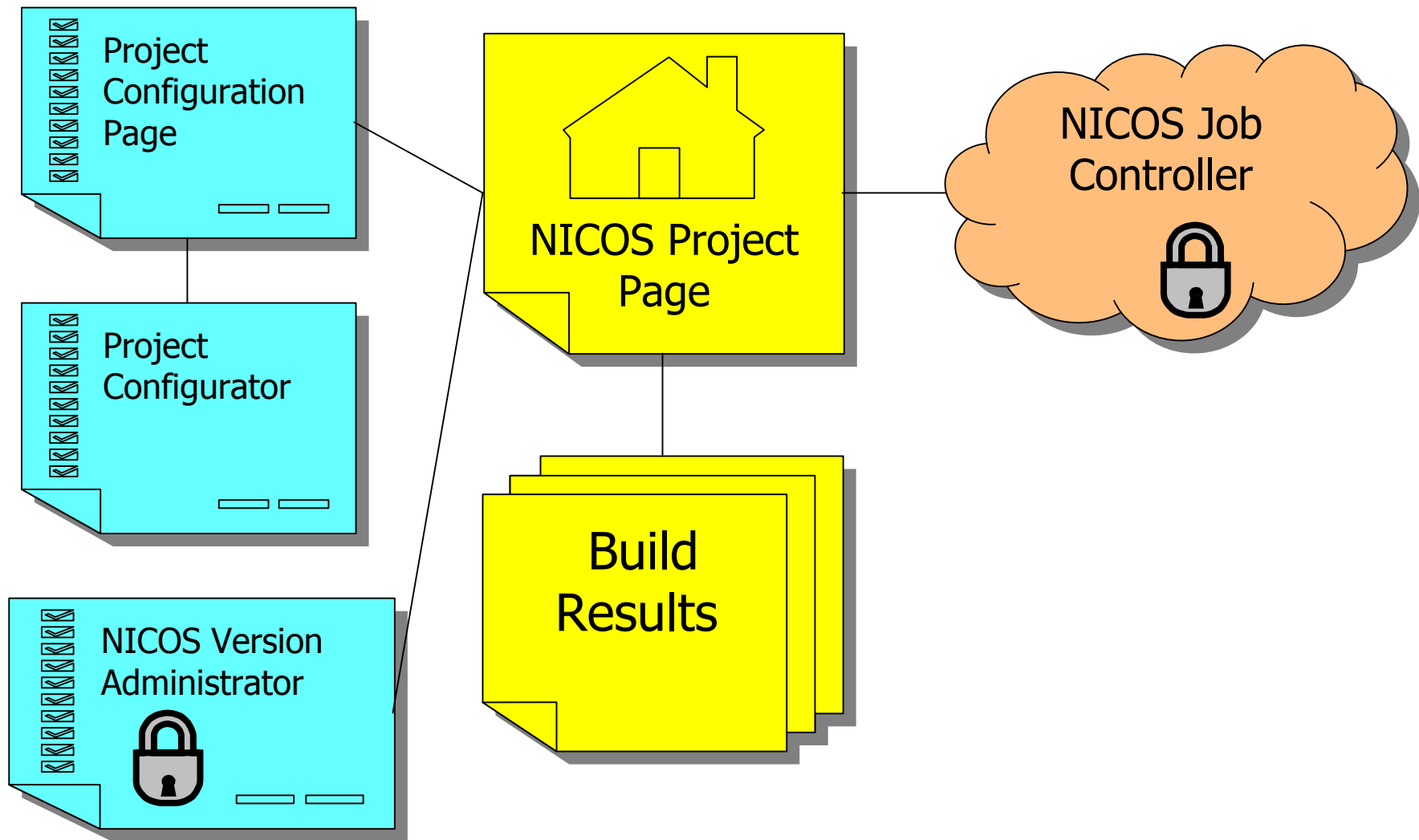
Example of NICOS Project Web Page

Example of NICOS Build Results Web Page

NICOS (NIghtly COntrol System) build results

Project: POOL
Release: POOL_RELEASE_6

Location: /afs/cern.ch/sw/lcg/contrib/releases/POOL/POOL_RELEASE_6/POOL_0_3_1
Tests and packages that are highlighted and marked with a red cross have problems
Click on names to see logfiles

Last modified Friday, March 14, 2003 19:41:24

Integrated tests results

integrated tests are not available for release POOL_RELEASE_6

Build results for individual packages

Package name	Container	Build	Test	Manager(s)
Common	N/A	✔	N/A	undrus
FileCatalog	N/A	✖	N/A	nobody
MySQLCatalog	N/A	✖	N/A	nobody

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Example of NICOS Job Controller Page

NICOS job controller - Microsoft Internet Explorer provided by Brookhaven National Lab...

File   Edit   View   Favorites   Tools   Help

NICOS version 0.2

NICOS (NIghtly COntrol System): Job Controller

Project: POOL
Location: /afs/usatlas.bnl.gov/project/nightly/POOL

Platform Linux

Working on release	Status	Release start	Step start	Action
POOL_RELEASE_1	CODE CHECKOU	03/16 01:41	02:03	Kill all processes / Restart (full) / Redo current step

Platform SunOS

Working on release	Status	Release start	Step start	Action
POOL_RELEASE_0	COMPLETED	03/15 03:40	-	Start immediately / Do not build today

Done   Local intranet

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Example of NICOS Version Administrator Page

Schedule

Three phases of NICOS development

Version 1

Version 2

Version 3

| Jan | Feb | Mar | Apr | May | Jun | July | Sep | Oct | Nov | Dec |
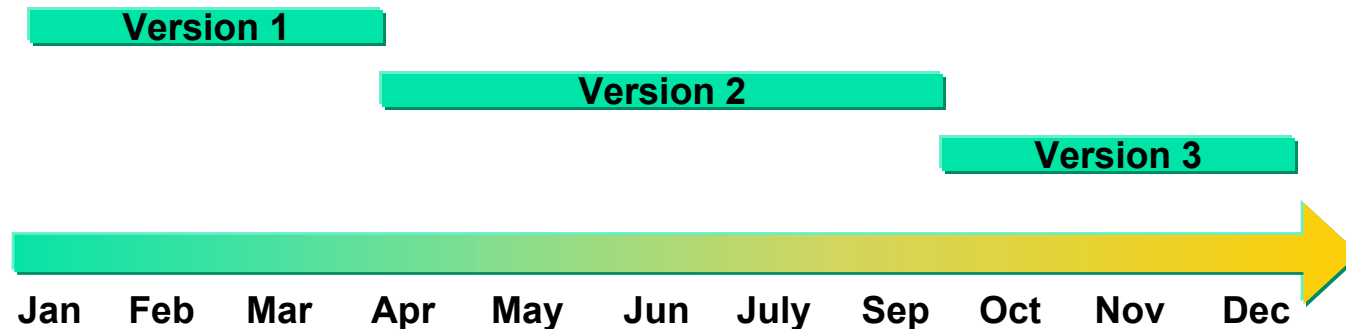
1. Basic functionalities
2. NICOS Web Master, replacing shell scripts
3. NICOS Smart Configurator, consider porting to Windows

NICOS projects

- Atlas Nightly Builds
    - Since autumn 2001
    - 500 packages
    - Several platforms and OS
    - About hundred developers
- POOL nightly builds
    - Since February 2003

Further Information

- ATLAS nightly builds web page
atlas.web.cern.ch/Atlas/GROUPS/SOFTWARE/OO/dist/nightlies/www/nightly_builds.html

- NICOS web page
www.usatlas.bnl.gov/computing/software/nicos/index.html

- POOL nightly builds web page
atlas.web.cern.ch/Atlas/GROUPS/SOFTWARE/OO/dist/nightlies/poolwww/index.html

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