NMQual:
A Tool to Automate Installation and Facilitate Qualification of NONMEM

PAGE 2005 Meeting
Pamplona, Spain
June 16-17, 2005

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Background

- Bugfixes and other source code changes in NONMEM often occur following the initial installation.
- This can often result in the user or company making a decision to not implement a bugfix or set of bugfixes based on the nature of the bug fix.
  - Likelihood of encountering the bug
  - Difficulty in updating all NONMEM installations
- If a decision is made to update the installation, keeping the source code current can be difficult for a number of reasons.
  - Manual modification of source code
  - Lack of automated method to implement bugfixes
  - Lack of control over installation/user once source code changes are implemented

Background

- Why is it important to keep NONMEM source code up to date (in a controlled manner)?
  - Difficult to know apriori if a given bugfix is important
  - Scientists using NONMEM should not have to question whether a given bugfix is implemented.
  - Reproducibility of results across scientists and between company and regulatory authorities

    (see ECPAG 2004 presentation – http://www.ecpag.org/presentations/2004/workshops/6_Gobburu_Session_II.pdf)
  - Recent presentations at industry meetings have indicated that a “qualified” install of NONMEM is likely to be required by regulatory authorities in the future (ECPAG 2004 and AAPS 2004).

Development Goal and Process

- Develop a tool (NMQual) to facilitate the automated installation and qualification of NONMEM on PC's running Windows and/or Linux
- Developed according to modern software life-cycle practices
  - User requirements
  - Design specifications
  - Implementation and development
  - Validation/verification via a formal plan
  - Installation and operation qualification
  - Training
  - Operation, maintenance/change control, and retirement

User Requirements

- Ability to update the NONMEM source code with all bugfixes
- Implement any user or site specific changes
- Install NONMEM with minimal user intervention
- Maintain an electronic trail of all changes made during the installation
- Test installation as part of overall qualification
- Allow a NONMEM run to be linked to a specific installation and any related code changes
- Automated implementation of several NONMEM test cases for operational qualification

Introduction

- What is NMQual?
  - A set of perl scripts to automate and test/qualify the installation of NONMEM (PC Windows or Linux)
- What are the system requirements to run NMQual?
  - Windows XP or Linux (developed/tested on SUSE 9.2 but other versions -Mandrake, RedHat, Debian- likely to work)
  - A working installation of Perl (Active State for Windows or Perl v5.8 or above for Linux)
  - A copy of the current (April 15th, 2004) GloboMax NONMEM CDROM
  - G77 or Compaq fortran compiler

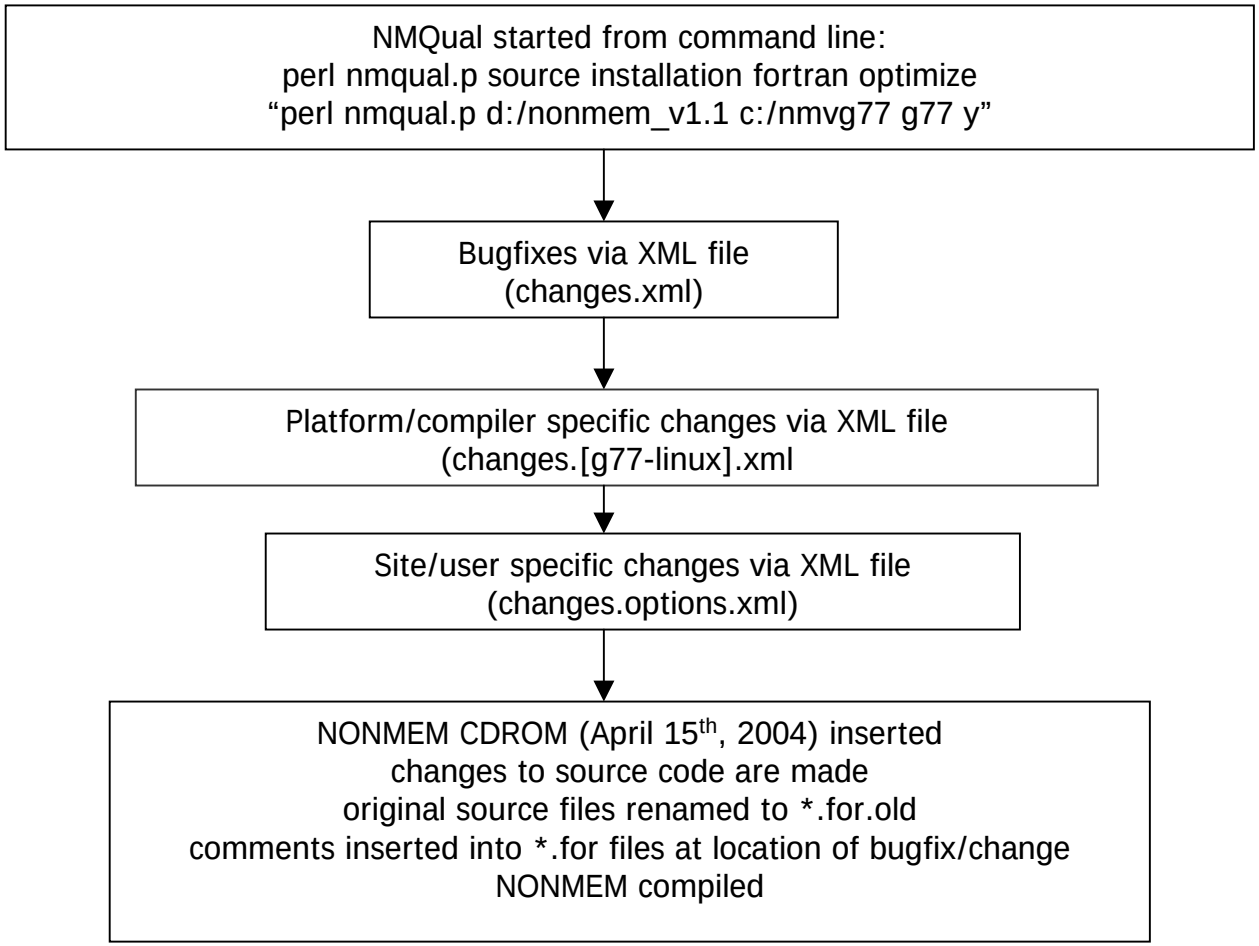
Introduction

- What does NMQual do?
  - Install current version of NONMEM with all bugfixes to date (automatically)
  - User/site specific changes to NONMEM can also be implemented (if requested)
  - Test the installation and operation of NONMEM via a set of control streams

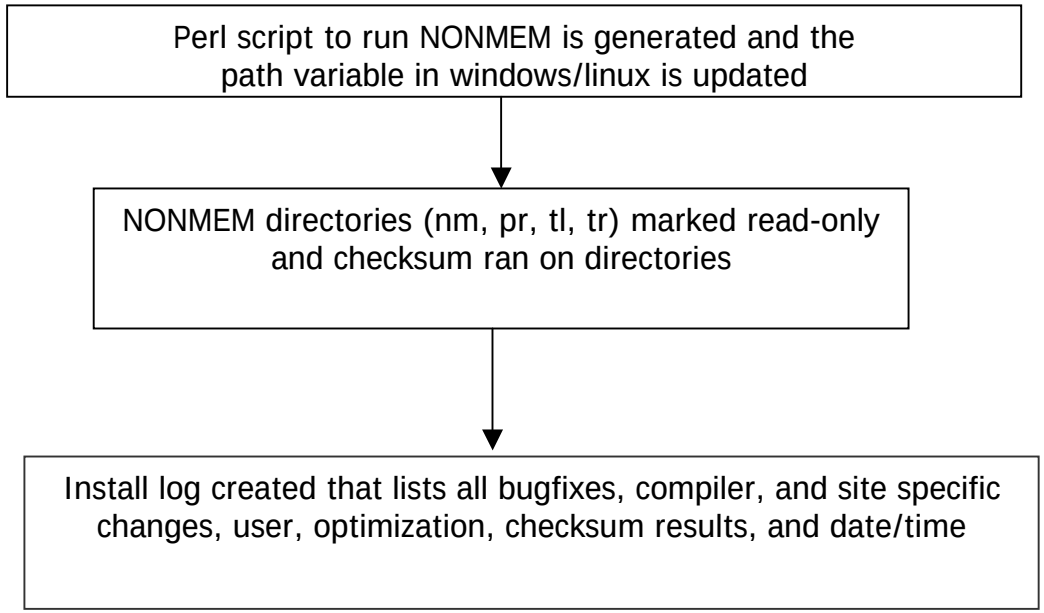
NMQual

- Run from a command prompt with a minimal set of arguments
  - Source and install directory, fortran command (g77 or df), optimization (y/n), nopause
- Default installation (supervised install) allows user to follow install and requires user input to acknowledge installation steps
- Setting “nopause” option allows unattended install except for insertion of NONMEM CDROM

NMQual
NONMEM Installation

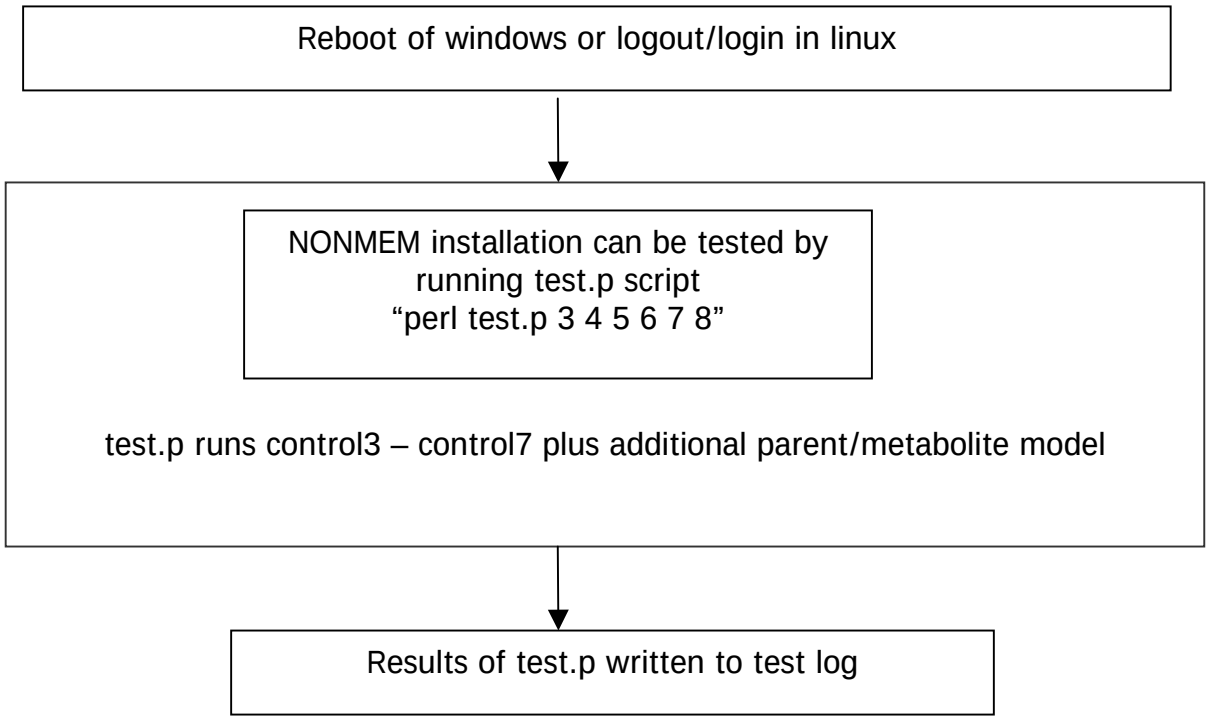


NMQual
NONMEM Installation

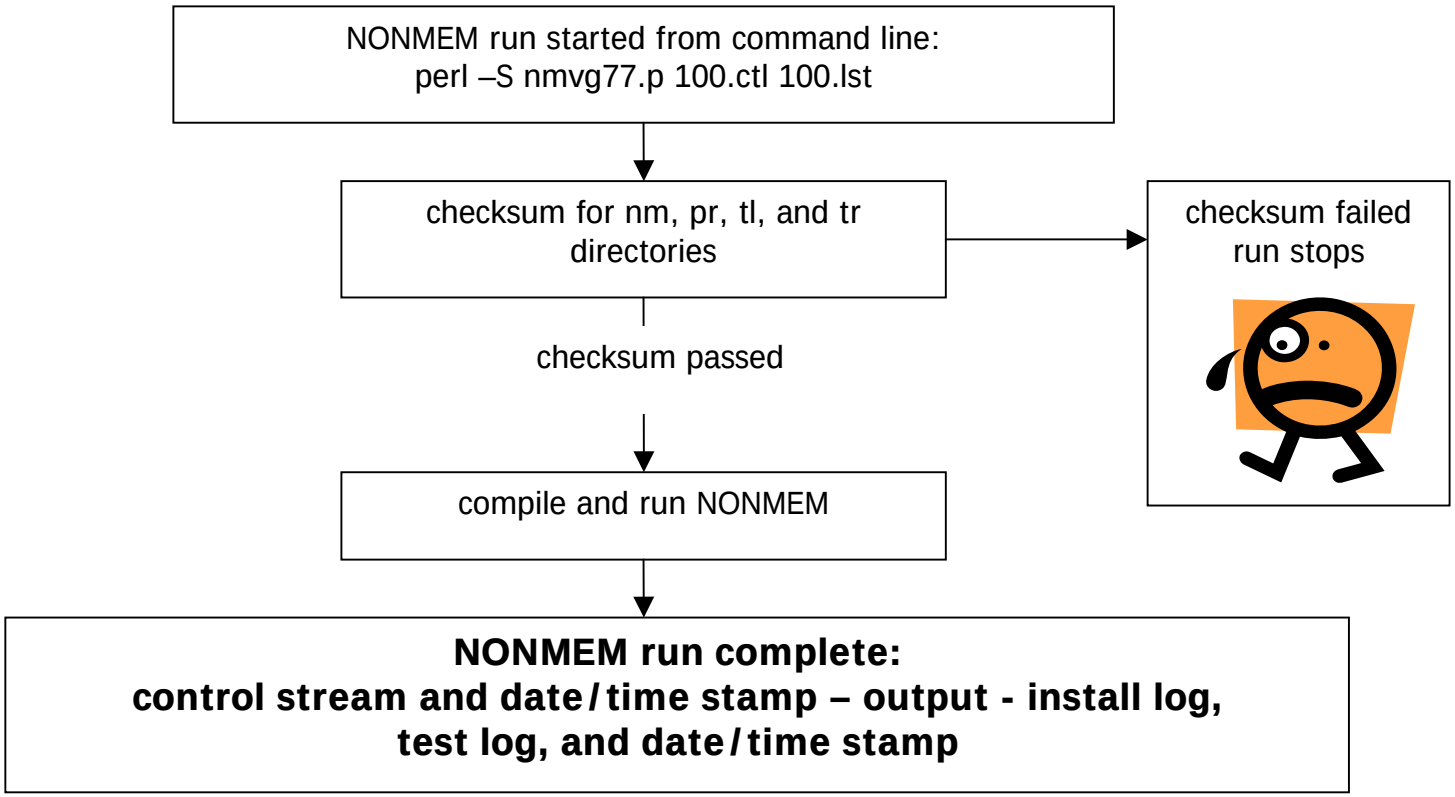


NONMEM Installation Complete!!

NMQual
Post-NONMEM Install



Running NONMEM



Benefits of NMQual

- Ensures a consistent and current NONMEM install across all NONMEM users
- Allows for the execution of NONMEM from any directory without the need for copying key files from the install directory
- Allows for different versions of NONMEM to be installed and used on same computer/project
- Maintains a link between a given NONMEM run and installation via the install and test log appended to each output file

Benefits of NMQual

- Provides a basis for the formal “qualification” of a NONMEM installation
- Ensures consistency of results across users, sites, and regulatory authorities
- Implements most of the suggested good practices for the qualification of NONMEM

  (see ECPAG 2004 presentation referenced in Slide 5)
- Simple mechanism to improve the quality control of NONMEM installations
  - checksum process eliminates possibility of user changes to source code

Limitations of NMQual

- Use of NMQual to install NONMEM does not automatically result in a “qualified” NONMEM installation
  - Additional document trail around the installation and qualification process is required for both NMQual and NONMEM
  - Metrum RG can assist in the development of the document trail, the customization of NMQual for installation/qualification, and in IT training
- Set of test scripts/control streams currently available is limited, but additional test scripts are planned for the future

Access to NMQual

- NMQual freely available (soon) as an iso image download from Metrum RG web site

  http://www.metrumrg.com

- Once burned to a CDROM the downloaded version of NMQual is fully functional.
- A set of installation instructions and FAQ's will be available on the Metrum RG web site.