Documentation with Doxygen and DocBook

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Topics

- Documentation is Essential
- Doxygen
- DocBook
- Questions
Documentation is Essential
Essential for Your Own Sanity

• People are burdened with multiple tasks and projects, often meaning you will be an expert in none of them.

• Will you remember what you did, why you did it and how it works? For how long will you remember it?

• Are you going to distribute your work? Good documentation can lower your support load.
Essential for Others

● So your coworkers don't curse your name when they have to support your stuff when:
  – you are on vacation or you have to tend to an urgent situation
  – you get hit by the proverbial bus…
  – they need to modify it

● So end users have a chance to use your magnum opus without cursing (too much)…
Essential for Tasks

- Installation
- Configuration
- Monitoring
- Use
- Problem identification and correction
- Maintenance and modification
Code Comprehension

• Writing code usually consumes only a smaller portion of your time. Supporting that code is often a longer term, but sporadic, task.

• The next three slides help illustrate the effect different types of documentation, or the lack thereof, can have on code comprehension.
The Really, Really Ugly

Excerpt from cable3.c, author Adrian Cable (Creative Commons Attribution-ShareAlike 3.0 Unported License).

A 1980s era PC emulator in 4043 bytes — One of the IOCCC 2013 winners!
Excerpt from `globus_i_gfs_data.c`, part of the Globus Toolkit GridFTP server, © 1999-2006 University of Chicago (Apache License 2.0).
/*!
 * @brief Implement initialization is acquisition for read locks.
 * Provides exception safe lock acquisition and release for RWLocked objects.
 * Ensures the lock is released when the enclosing scope exits, regardless
 * if this happens by exception or a return/break.
 */

class ReadSentry
{
private:
  RWLocked& lock;
public:
  //!/@name Constructors
  //@{
  ReadSentry() = delete;
  ReadSentry(const ReadSentry&) = delete;
  ReadSentry(ReadSentry&&) = delete;

  /*!
   * @brief Constructor.
   *
   * Acquires the lock.
   *
   * @param[in] l The Locked object.
   */

Excerpt from locking.h, part of the HSS libutils C++ library, © 2013 UCAR
Doxygen
Doxygen

- www.doxygen.org
- Written by Dimitri van Heesch and additional contributors.
- Current version (Dec 2013) is 1.8.6
- Runs on Linux, OS X, Unix and Windows
- Supports C, C++, C#, Fortran, Java, Objective-C, PHP, Python, Tcl, VHDL, some IDL flavors and, to some extent, D.
Doxygen Advantages

- The documentation is embedded in the source code, making it harder to lose, and immediately accessible to persons reading that code.
- Doxygen parses the source code and can warn you when documentation is missing for code constructs or when they are out of sync.
- Doxygen takes care of most of the grunt work to produce attractive and usable documentation.
- Integrates easily with make, etc.
Doxygen Work Flow

Figure 3.1 from the Doxygen User Manual © 1997-2013 Dimitri van Heesch (GPL)
Doxygen Inputs

- Text configuration file(s):
  - Option settings
  - Output format enables
  - Local customizations
- Source code embedded comments (including optional HTML tags and entities)
- External text files and images
- Doxygen tag files referencing another component's Doxygen documentation.
Doxygen Output Formats

- HTML, LaTeX, man pages, RTF, XML, DocBook
- Indirect support for:
  - Compiled HTML Help (aka Windows 98 Help)
  - Qt Compressed Help
  - Eclipse Help
  - XCode DocSets
  - PostScript
  - PDF
Doxygen HTML Output

- The most popular output format according to the Doxygen web site.
- The look is easily customizable using CSS.
- Automatically generated hyperlinks makes navigation easy.
- Examples (external to this slide set)
DocBook
DocBook

- DocBook is an XML based semantic markup language for technical documentation.
- Current version is 5.0.
- Specification is maintained by the Organization for the Advancement of Structured Information Standards (OASIS).
DocBook vs WYSIWYG

- DocBook has a higher learning curve.
- DocBook source files focus on **content and semantic meaning**, not presentation.
- DocBook is not a single application – it requires a tool set to produce output. i.e.:
  - Repeat: (edit / make / review output)
- WYSIWIG tools often get in your way and obscure semantic meaning.
DocBook Workflow
Getting Started with DocBook

• You really should acquire these books:
  – DocBook 5: The Definitive Guide
    • How to create DocBook source files
    • How to convert DocBook files to other formats

• Install a tool set:
  – Available packages for your favorite distribution
  – Do it your self (my “how to” notes at SEA web site)
  – Use the XML mode of $EDITOR
Sample DocBook Toolset

- Your favorite $EDITOR
- Saxon 6.5.5 XSLT processor
- DocBook XSL 1.78.1 style sheets
- Apache FOP 1.1 XSL-FO processor
- Jing 20091111 schema validator
- make
DocBook Inputs

- XML/XSL text files:
  - Configuration and customizations
  - Document content
  - Custom DocBook schema extensions
  - Custom output format style sheets
- External files and images
DocBook Output Formats

• Produce multiple output formats from a single source by using different XSL style sheets or other post processors:
  - XML
  - HTML
  - XSL-FO (postprocess this to PDF)
  - man pages
  - texinfo
  - custom
DocBook Hints

- Use XML entities (macros) for:
  - reducing the amount of typing you have to do
  - hide the verbosity of XML tagging
  - document wide changes can be made in one location
  - keep one copy of content that is repeated in multiple places
- Conditional text allows one source to produce variant content output (i.e. for different OS targets).
- Split larger documents into parts by making use of XML Inclusions.
- Use a schema validator to verify document consistency
DocBook Useful Links

- Schema: http://docs.oasis-open.org/docbook/specs/docbook-5.0-spec.html
- Apache FOP: http://xmlgraphics.apache.org/fop/
- Saxon XSLT Processor: http://saxon.sourceforge.net/
- XML spec: http://www.w3.org/TR/2008/REC-xml-20081126/
- XSL spec: http://www.w3.org/TR/2001/REC-xsl-20011015/Overview.html#contents
- XSLT spec: http://www.w3.org/TR/xslt
- docbook2x (docbook2man): http://docbook2x.sourceforge.net/