

The GNOME Architecture

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Overview

- What is in GNOME?
- Architecture in detail
- GNOME programming guidelines

What is in GNOME? (1)

- Graphical desktop environment
 - GTK+ as the GUI library and object system
 - Standard GUI
 - Consistent look and feel
 - Drag and drop
- Application framework
 - High-level widgets for applications
 - Internationalization (all 20 letters of it)
 - Session management
 - Configuration back-end
- Imaging architecture
 - The GNOME canvas
 - Libart imaging model
 - Printing system
 - Font system

What is in GNOME? (2)

- Component model
 - CORBA as the backend
 - Bonobo component model
 - Interfaces for (lack of) Unix services
- Miscellaneous backend libraries
 - libxml — XML loading/saving/parsing
 - gnome-db — Generic database API
 - libglade — GUI builder library
 - gnome-mailer — Mail API
 - libgtop — System information
 - zvt — Fast terminal emulation widget

GTK+ and Glib

- Glib
 - Data structures
 - Utility functions
 - Main loop abstraction
 - Portability functions
 - Threads and mutexes
- GTK+
 - Gdk wraps Xlib
 - Gtk provides objects and widgets

Glib (1)

- Data structures
 - Lists
 - Trees
 - Hash tables
 - Resizable arrays
 - Strings
 - Relations (N-way mappings)
 - Generic cache
- Utility functions
 - Memory allocation and memory chunks
 - Assertions for correctness
 - Logging and debugging
 - Datasets and hooks
 - Date functions
 - A lexical scanner

Glib (2)

- Main loop abstraction
 - Data sources for select(2)-like functionality
 - I/O channel abstraction
 - Timers
 - Idle functions
- Portability functions
 - All sorts of weird string functions
 - Byte-swapping functions
 - Useful macros
- Thread and mutex abstraction

Gdk

- Thin wrapper over Xlib
- Makes operations less hard (or easier)
- Ported to Win32 as well

GTK+

- Object and type system
 - Single inheritance
 - Signal/slot mechanism
 - Dataset mechanism
 - Dynamic type registration
- Widget system
 - Widgets and containers
 - Geometry negotiation
 - Signals for notification

GTK+ **Widget Organization**

- Base GtkWidget class
 - Signals for events
 - Signals for map/unmap/realize/unrealize/etc.
- Base GtkContainer class
 - Containers are widgets
 - They manage their children's geometry
 - Request/allocate size negotiation policy

GTK+ **Drag and Drop**

- Xdnd and Motif protocols
- Protocol is transparent to the programmer
- Based on MIME-types

Imlib, GdkPixbuf, and GdkRGB

- Imlib/gdk_imlib
 - Image loading with fallbacks
 - Color reduction and dithering
 - Image/pixmap Cache
- GdkRGB
 - High-quality dithering
 - Part of Gdk
- GdkPixbuf
 - Replacement for gdk_imlib
 - Separates loading, caching, and rendering
 - Uses GdkRGB

Core GNOME Libraries

- Libgnome for UI-independent stuff
 - Configuration file handling
 - Metadata for files
 - MIME-type handling
 - URL and Mozilla-remote handling
 - High score handling
 - Desktop entry files
- Libgnomeui for GUI framework
 - High-level widgets
 - Session management client
 - The GNOME canvas

Libgnome Features

- Configuration file handling
- Metadata information for files
 - Icons images, positions
 - Stored in a db2 database
 - Per-user and systemwide metadata
- MIME-types
 - Basic data typing system
 - Files are typified via a regex or file(1)-like match
 - Actions bound to MIME-types
- URLs, scores, desktop entries

Libgnomeui features

- High-level widgets
 - Toplevel application window
 - Menus and toolbars
 - Stock icons
 - Property dialogs
 - GnomeGuru (wizards)
 - Multiple document interface (MDI) framework
 - The GNOME canvas
- Session management client
 - Implemented as a GtkWidget
 - Signals for SM requests

Internationalization

- GNU gettext for storing and translating message catalogs
- Unicode in GTK+ is the next step