

GNU Enterprise - Developers Introduction

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Chapter 1. An Introduction for Developers

Introduction

GNU Enterprise is a meta-project aimed at developing a complete enterprise level business environment. It will consist of tools to quickly build business applications. Several packages and modules will be available ready for out of the box use or readily available to extend or customize to your needs. There will be templates by industry type so you are only getting the base of what your industry type would use.

Why?

Businesses seeking to move to digital processes often find themselves with limited options. They find themselves choosing between the following options.

Purchase proprietary shrink-wrapped software

This option has many drawbacks which include but are not limited to.

- The business is forced to adapt their processes to conform to the rigid requirements of the purchased software.
- A single source for updates and maintenance.
- Their fate is tied to that specific vendor.
- Often such packages have high entry costs many small or new businesses can not readily afford.

Pay a consultant to create their software

This solution is better than a shrink-wrapped solution. The software is usually tailored to the exact business needs. It does have a few drawbacks however. The software is tied to a specific consultant or company, usually by copyright, in the same manner as shrink wrapped software. If the consultant closes down their business, their customers can be left without any means of support. If source code is not available the system can't be maintained. If the source code is available, a new consultant must be paid to learn the entire system before maintenance is possible. The unique nature of the system has left the business vulnerable.

Maintain an in-house programming team

This solution is better than paying a consultant if a business can afford the personnel needed to maintain the systems. But hiring only a single programmer leaves a business in the same position as with a consultant. Many smaller companies cannot afford several full-time programmers. The unique nature of the code requires all development and testing to be done in-house. Since the software isn't usually shared outside the business it doesn't get the levels of peer review needed to achieve the highest quality.

None of these solutions provide a business with the security and freedom they deserve. Often businesses find themselves making compromises in their business practices and paying large sums of money to vendors they don't particularly care for simply because they are "locked in" to a specific solution.

It doesn't need to be this way.

Features

Modular System Design

GNU Enterprise objects are defined at application run-time. This allows a system to be easily and rapidly modified by end users without risk of compromising the core system.

A technically savvy business owner can browse a list of modules from a library on the GNU Enterprise site. She can pick various packages and modules that are of interest, install them via a tool like RPM, check out their features, remove the ones she doesn't like, finish up her testing and go live. As new packages and modules become available she can add and remove them as she desires (within reason). She ends up with a system that is exactly to her liking w/o the expense of hiring a consultant to customize the system.

To achieve maximum modularity and be all things to all people within reason, GNUe is looking at the following approach. GNUe will be a set of tools to build business applications. With these tools modules will be built. Modules will be bundled by similar function to create packages. One problem in doing this is the different needs of different industries. A doctor has a very different billing situation than car dealer ship for instance. Therefore, there will be "templates" by vertical industry if need be. The concept is GNUe->Packages->Modules->Components where components can be reused among modules. Modules are bundled by type ex: accounts receivable, accounts payable, general ledger are bundled in accounting package. Then multiple packages make up GNUe. Then each vertical industry can have specific templates if desired to make customization minimal from set up to setup. (Further documentation and flow charts coming on this subject.)

Open Architecture

Every effort has been made to open the GNU Enterprise system to developers and users. CORBA provides a clean interface to the objects that comprise a functional GNU Enterprise system. All data is stored in a relational database system. The database structures are well documented and accessible via standard SQL. XML is used to define forms that are parsed and executed by a wide variety of clients.

Powerful Development Framework

The base distribution of GNU Enterprise will contain several powerful tools. Tools like GNUE Forms, GNUE Reports, GEDI, GEAS and EWOK will allow developers to rapidly develop GNU Enterprise applications.

Consistency

Widespread deployment of GNU Enterprise will allow programmers to become familiar with the core GNU Enterprise components. They should require little time to get up to speed on a specific company's modifications to the code. This frees the programmer from learning the details of a unique system that is useless to them in other jobs. They can spend more time doing what they enjoy, writing code to solve unique problems.

Freedom from Single Source Vendors

A consultant can assure their customer that in the event they were unable to maintain the software it would be easy to find others familiar with the core system. This also provides the business some assurance that the consultant won't hold a monopoly on their systems, that they are free to let others work on their code.

Easy Maintenance

Since modules are used to store alterations to the system. Modifications made by the end site are stored separately from the generic distribution. Updates to the generic system can be applied without effecting local changes. Consultants need not maintain several virtually identical source trees with individual customer alterations, simple modules store all the changes.

Package Library

A person setting up an GNU Enterprise system would have access to growing number of packages for the system. These packages could be specialized for specific areas of business (manufacturing, legal, etc.) and would allow a programmer to produce a fairly specialized system in short period of time then tweak the system to meet the exact needs of the business.

Reuse of Free Software

Every effort has been made to reuse existing code and projects where feasible.

Versioning System

Due to the modular nature of GNU Enterprise care must be taken to ensure that packages are compatible with one another. To ensure this level of compatibility every package and object must register its version level upon installation. This allows other packages and objects to specify which items, and versions of those items, that they are dependent upon.

Best Practices

Because GNUe will be in use in a wide variety of industries and will have influence from many developers as well as many users best practices will be developed. This allows companies new to the digital age or just forming to see how some well established companies are using technology and to build off their successes if they wish. In the future we see possibility of GNUe user groups as well as GNUe conferences and/or GNUe team showing presence at open source conferences.

Internationalization

GNUe already has representation on development team from Austria, Spain, Belgium, Norway, Finland, Estonia, United States and others. Which guarantees strong support for both foreign currencies, multi-languages (docs and applications) as well as 24/7 developer end user support and close proximity for conference / user group attendance. Something not even large scale ERP products are doing well.

Examples

The best way to understand what GNU Enterprise does is through examples.

High Level Demo

We'll start with a very high level demo which involves the sale of an item from inventory. The sale of this item has caused the inventory levels to drop below the reorder point (in this example there are no parts kept in stock so reorder point is zero)

The entry of the sale into GNU Enterprise would cause the inventory system to review the part.

The inventory levels are too low so either a purchase order could be automatically generated or the purchasing department could be notified with a request for purchase.

Once the order is placed with the vendor the system tracks these tentative parts so that additional sales can be processed with approximated ship dates.

When the parts arrive, their entry into the system alerts the shipping department with a list of orders that can now successfully be shipped. Accounting is notified that the order has been received and vendor payment is acceptable. The delivery efficiency of the vendor is tracked based upon the vendors promised delivery date vs the actual date of product arrival.

The shipment of the parts cause an invoice to be generated of the accounting department that the customer should be invoiced.

Payment from the customer closes the order.

Consultants

Consultants can use GNU Enterprise to reduce the time they spend maintaining custom solutions for their customer. In addition they can greatly increase the speed in which they can respond to customer requests.

As an example we'll look at the steps Carl D. Consultant takes to install and customize GNU Enterprise to meet the needs of his customers.

We'll first start at the local car dealership where Carl

- Installs GNU Enterprise - Core
- Installs the Car Dealer template(s)/package(s) which were created by some other car dealership. And, in the spirit of sharing uploaded to the GNU Enterprise package(s)/template(s) library. The template(s)/package(s) specifically....
 - Modifies the CRM module included in the GNU Enterprise install to include a field to track a customers favorite type of car.
 - Installs the needed components, modules, and packages to provide an auto maintenance history system to the repair shop.
 - Tweaks the generic inventory module to handle issues specific to automobiles
 - Installs the needed components, modules, and packages to maintain an auto parts counter
- Installs his custom birthday tracking component. The component specifically...
 - Modifies the CRM module included a field to track a customers date of birth.
 - Installs a component that generates a report of customer's upcoming birthdays. This allows the dealer to send birthday greetings to his prior customers.
- Installs module(s) to add specific modifications to the system the car dealer requested.

At the local doctors office

- Installs GNU Enterprise - Core
- Installs the Medical Facility template(s)/package(s) which he created and maintains for this customer. He has also made these template(s)/package(s) available to others via the GNU Enterprise web site. The template(s)/package(s) specifically...
 - Adds features needed for insurance tracking
 - Adds patient medical records tracking
- Install pharmacy template, found on GNU Enterprise web site, to maintain the local office's pharmacy. This template specifically....
 - Tweaks inventory module to handle drug expiration
 - Modifies CRM module to check current medical & check for drug interactions
 - Altered his generic medical facility package to include features this customer did not want shared with other users of GNU Enterprise. Features they felt gave them a competitive advantage.
- Installs his custom birthday tracking component
- Installs module(s) to add specific modifications to the system the car dealer requested. These modules specifically....

At the local school

- Installs GNU Enterprise - Core
- Installs Maintenance template(s)/package(s), which was donated to GNU Enterprise, These template(s)/package(s) specifically....

- Tracks building maintenance
- Provides a preventative maintenance system
- Installs Education template created by the staff at O.P.U (Our Public University) and donated to GNU Enterprise. The template specifically...
 - Tweaks inventory module to deal the students not parts
 - Adds sports event tracking module
- Installs customizations he developed for the school to handle the schools odd dining system

All the modules above come with modification files for screens, new screen definitions, triggers, fields, objects, functions, etc. He verifies the systems, their screens, completes testing, trains the staff, and gets paid.

Now we release the new improved basic distribution (Now with 50% more bytes in every tarball!)

He simply does something like

```
rpm -U generic-1.6.8.rpm
```

at all sites

He runs a few tests, charges the customer the upgrade fee. Or, because he's in and out so quickly his yearly maintenance fees are inexpensive so his customers don't mind subscribing to them.

He's not burning any time merging GNU Enterprise updates into sections of code he had to alter for each business. He's not hand merging his screen changes into the system.

Kathy then releases a new Maintenance template that adds a feature the school has been talking about but would cost more than they care to spend on Carl to create. Carl says, "Tell you what, since you're such a good customer. And I'm such a great guy. We'll get it done for only \$\$ instead of \$\$\$\$". He does a

```
rpm -U maintenance-2.0.1
```

tests, trains. Schools happy because they got their feature. Carl's happy because he's made a little money where he would have made none.

Templates/Packages

It would be almost impossible for a small group of developers to oversee every aspect of GNU Enterprise. In order to deal with this complexity the project is decomposed into separate projects known as packages each with vertical industry templates. Each package consists of everything needed to provide a single feature set to GNU Enterprise. Templates are a way to group the packages by industry. For example, the GNUE Accounting package provides General Ledger, Accounts Payable, Accounts Recievable, etc. capabilities to the system. (More diagrams and explanations coming soon.)

Categories

Standard

For a package/template to be considered standard it must be developed within a specific set of guidelines. These guidelines ensure that the package will work on any system that has successfully installed the basic distribution. They also ensure that the package is friendly toward other GNU Enterprise packages.

The basic distribution of GNU Enterprise will contain several packages that are determined to be essential to a majority of businesses. Only standard packages will be considered for inclusion in the basic distribution.

Extended

Extended packages are packages that have requirements beyond those of the standard package. They might require an administrator to install additional languages on the system. They must however meet compatibility requirements. Extended packages are considered safe to use they simply require additional effort during setup of the system.

Unfriendly

Unfriendly packages are the "hacks" that almost everyone has utilized at one time or another. They bypass all guidelines so they can "just get the job done". Updates to the system may cause these packages to break themselves, or the system.

Base Packages

Table 1-1. Base Packages

GNUe Core	The general GNU Enterprise Tools. GNUe Forms, GNUe Reports, GEDI, GEAS and EWOK.
Accounting	Accounts recievable, Accounts Payable, General Ledger, etc.
Budget Management	Forecasting, Analysis, Controls, Auditing, etc.
Customer Relationship Management	Sales Management, Help Desk, etc.
E-commerce	E Shopping, E Merchandising, E Order Processing, etc.
Human Resources	Payroll, Time and Attendance, Benefits Management, etc.
Project Management	Resource Allocation, Cost Estimation, etc.
Research and Development	Bug Tracking, Statistics, etc.
Supply Chain	Inventory, purchase orders, etc.
Point of Sale	Point of Sale, Scanning, etc.

The rest are to be determined.

Other Packages

None available yet.

Architecture

Most GNU Enterprise programs are broken down along a N-Tier architecture. Which consists of

Back-end

GNU Enterprise relies on a third party SQL based RDBMS for data storage. GEDI will allow support for a variety of database systems. (GEDI Proposal and information coming soon.)

Initial development efforts center around the usage of the PostgreSQL RDBMS or unixODBC.

Business Objects

Business objects are the heart of the GNU Enterprise system. These CORBA enabled objects provide most of the business logic in the system.

Application

Applications can be broken down into two types, those that provide a user interface and those that do not.

For applications that provide a UI this would be the logic behind the interface. It doesn't contain any business logic in most cases, that's one layer down. It contains the processes that occur when a trigger is fired from the ICL (button X is pressed, app has requested shutdown, menu item Y selected, etc.)

If all ICLs support a standard set of form widgets, and a standard set of functions like `get_functions` required to provide a list of defined functions in the application. It seems possible to develop a nice IDE for simple apps along the lines of VB.

An application could also be written at this level that would "simulate" the old SQL*Forms program (with all it's flaws and bonuses). It would bypass the lower levels and would make a nice GUI builder for direct table access (something we should probably avoid, but someone, somewhere will need it)

Most developers new to GNUe would work in at this level using only the higher level business objects and the IDE.

The other type of applications would be applications that perform basic batch style processing on the GNUe objects.

ICL

Interface Client Level (aka Thin Client)

These programs are basically identical regardless of what language/platform they cover. They assume a certain number of procedures are available from applications. One of the most important would be a "get_ui" call that would tell the application to send a description of the form to be drawn (encoded in XML). These programs would handle mapping UI widgets

we've defined as valid for an OBE user interface. Things like entries, labels, lists, picture, text, notebook tabs, triggers, etc.

Tools

GNU Enterprise will provide several tools that provide a powerful application development framework.

GNUe Forms

GnuE Forms actually consists of two separate programs. A designer which generates user interface definition files and a client which displays screens and accepts input from the user.

The GnuE Forms painter provides developers with a system that allows rapid development of data entry screens. A developer simply chooses the objects and fields of interest and arranges the interface widgets to their liking. The system then generates a XML based interface definition file that is used by the clients.

The GNUe Forms client reads the interface definition file produced by the designer and generates a data entry screen based upon its contents.

Since the interface definition file is simple XML text it is very portable. Clients can be written for any number of display and data entry technologies and all utilize the same interface definition file. Thus building a single screen via the desinger instantly makes it available to all clients.

In addition programs can be written to communicate directly with a client using its XML interface definition language. This allows programmers to bypass limitations of the screen designer while retaining the robust, standardized front end clients.

GNUe Reports

GNUe Reports shares many features with GNUe Forms. It is comprised of a report designer and a client that generates the requested output. Report definition files are also XML based. And programs can communicate directly with the XML reports definition language much like they can with GNUe Forms.

GEDI (GNU Enterprise Data Interface)

Data abstraction layer. Allows single API to all data sources. So the client has one set of calls it uses, but can access different vendors databases or even CVS or XML files. Similar to Borland's Database Engine or other data abstraction tiers. It will encompass much more than that and a proposal is forth coming.

EWOK (Enterprise Wide Office Kommunication)

Integration for faxing, telephony and other such communcations with in GNUe.

GEAS (GNU Enterprise Administration System)

Security administration and over GNUe administration functionality. More to come with proposal.

Appendix A. GNU General Public License

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