GIPSY:
TECHNICAL INFORMATION

GIPSY® is a powerful dynamic graphics tool for real-time data display. It offers a comprehensive development environment, which consists of a configurable editor for drawing objects and linking them to real-time data, as well as a powerful runtime environment.

Tools

Dynamic Views With G-Draw

G-Draw is an interactive graphics editor that guarantees the fast and efficient development of interactive man-machine interfaces (MMI) containing image data, data bindings, dynamics, and commands that control the behavior of the user interface.

G-Draw also serves as a test center. The behavior of the views can be tested inside the editor with real or simulated data.

G-Draw provides a highly comfortable working environment. It is multi-language, can be easily adapted to the project specific engineering workflow, and lets you link graphic objects to data sources such as PLCs, databases or any other software in no time. Thus, even highly complex projects can be realized in a very short time.

G-Draw – Features:
- Configurable drawing area
- A variety of graphic primitives, which can be linked to any dynamics
- Zoom, copy, group
- Layer-support
- N-level undo
- Predefined input objects
- A large number of predefined standard symbols
- Extensible, scriptable
- Domain- and application-specific symbols
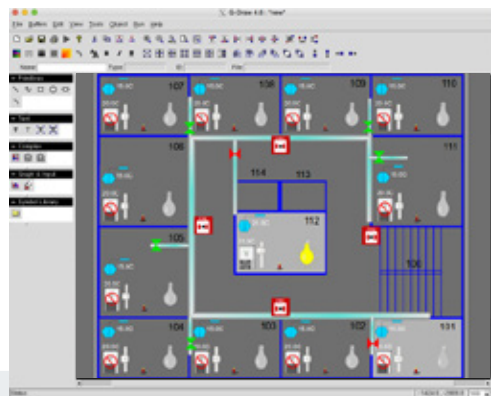
Still, some applications require a specialized graphics editor, for instance when using a standard symbol set, corporate design, style or identity. Because of its remarkably open architecture, GIPSY® provides an excellent basis for designing such customized editors. As part of the GIPSY® development environment also the source code of GIPSY®'s editor G-Draw can be used. Thus, even complex projects for creating highly specialized custom editors can be realized in a very short time.

Rapid Prototyping with 4GL

GIPSY®'s integrated 4GL gives you the ability to develop a system application incrementally. The built-in 4GL also allows for incremental updates during run-time, thus minimizing the maintenance downtime. The 4GL is based on Tcl/Tk, a widely accepted industry standard, and offers a powerful command set that meets even the most demanding needs of monitor and control system.

Furthermore, the command set can be extended by creating new, specialized commands. Whenever an application needs to be updated, this can be done at run-time. Thus, GIPSY® provides all necessary flexibility needed to be successful in today's fast-changing and highly competitive markets.

In addition to GIPSY®'s standard 4GL, the systems also allows to code and script actions in JavaScript leveraging the full power of the client platform for application development.

Furthermore, there is a large set of Tcl/Tk extension packages like database-access, XML/SOA, JavaScript, Communication, and GUI available.

Complete Control with GIPSY® Core

GIPSY®'s core manages the entire application and ensures the proper execution of commands and rules. It also handles events that are bound to graphic objects, acquires data, and updates the display.

GIPSY® allows for an unlimited number of views, graphic objects and data points; this performance concept facilitates the development of large application systems.
All activities within GIPSY® are event-driven. For example, if a user selects a graphic object, the GIPSY® core creates an event and updates the object in a pre-configured way or carries out a specified action, for example a screen change.

The GIPSY® core offers an application interface for the windowing and operating system; this provides a set of functions for window and widget handling. The open-development environment of GIPSY® allows you to expand GIPSY® in any way and integrate it into existing environments. Thus, external modules and legacy code can be easily integrated and GIPSY® applications can be used with other applications, such as real-time databases, RDBMSs, workflow management systems or statistical programs. In short, GIPSY® protects your current and future investments.

Of course, GIPSY® allows the administration of access rights for single actions or complete views. All actions can also be recorded if need be.

Engineering

Visualization for the Internet of Things (IoT)

With GIPSY® you can monitor your application over the Internet using stationary devices (PCs, workstations, etc.) or mobile devices like tablets (for example iPad) and smartphones. GIPSY® supports a large number of current browsers and uses HTTP/HTTPS.

Client/Server-Technology

GIPSY® provides a flexible client/server technology. Applications may be distributed over WAN/LAN networks, using the TCP/IP standard. It is possible to connect from any workstation or PC to any GIPSY® server on the network in a secure and well-defined manner.

Using a GIPSY® application server, applications and views can be centrally managed and updated while the system is up-and-running. Additionally, GIPSY® applications can be accessed and utilized using workstations, PCs, tablets and smartphones without any extra effort.

"Develop Once, Deploy Anywhere"

GIPSY® handles all details of high-quality visualization applications. No matter if you operate with a browser, Windows, Linux, iOS, Android, Solaris, HP-UX, etc. – once the application has been customized to your needs, it operates on all supported platforms without any added modifications. **"Develop once, deploy anywhere"** – that's the guiding principle which has made GIPSY® the most outstanding tool of its kind.

GIPSY®'s visual and intuitively operable development environment accelerates your application development significantly. No need to take care for the platform specific details of the user interface – just focus in the conception and the behavior oft he GUI. GIPSY® ensures that the GUI performs according to the native **Look-and-Feel** of the respective target platform.

Easy Data Access

GIPSY® can connect dynamic graphical objects to any number of processes and data sources (e.g. PLCs and databases), without the need to write specific code. Instead, the use of asynchronous messages, ODBC, OPC, and the like within the editor connect data to the graphic objects. GIPSY® also provides easy data integration for standard and custom protocols.

Easy Development

GIPSY® provides all you need for the development of high-performance control systems:

• Unlimited number of graphical objects in an application
• **Point-and-click** connection of data sources and animated graphical objects
• Creation of company and project specific object libraries including all information
  about graphic and dynamic behavior
• Automated creation of dynamic views at runtime
• Supports ActiveX, DDE, ODBC, OPC, RDBMS, various Message Services
• Virtually unlimited scalability

Open Interfaces and Extensibility

GIPSY® offers a large number of open interfaces to your operating system with a broad set of efficient functions. The openness of these interfaces allows you both, to expand GIPSY® and to integrated it into existing environments, with already defined APIs. Whenever you want to expand your application, you can do this at runtime. GIPSY® offers interfaces for a large number of Tcl/TK-extensions like Realtime databases, OPC, fieldbuses, RDBMS, Ajax/JSON, JavaScript, GUI, workflow-management-systems, statistics or GIS-Systems.

For Web-based applications, the integration is performed by the GIPSY® application server which acts as a proxy for all browser-based clients on smart portable devices.
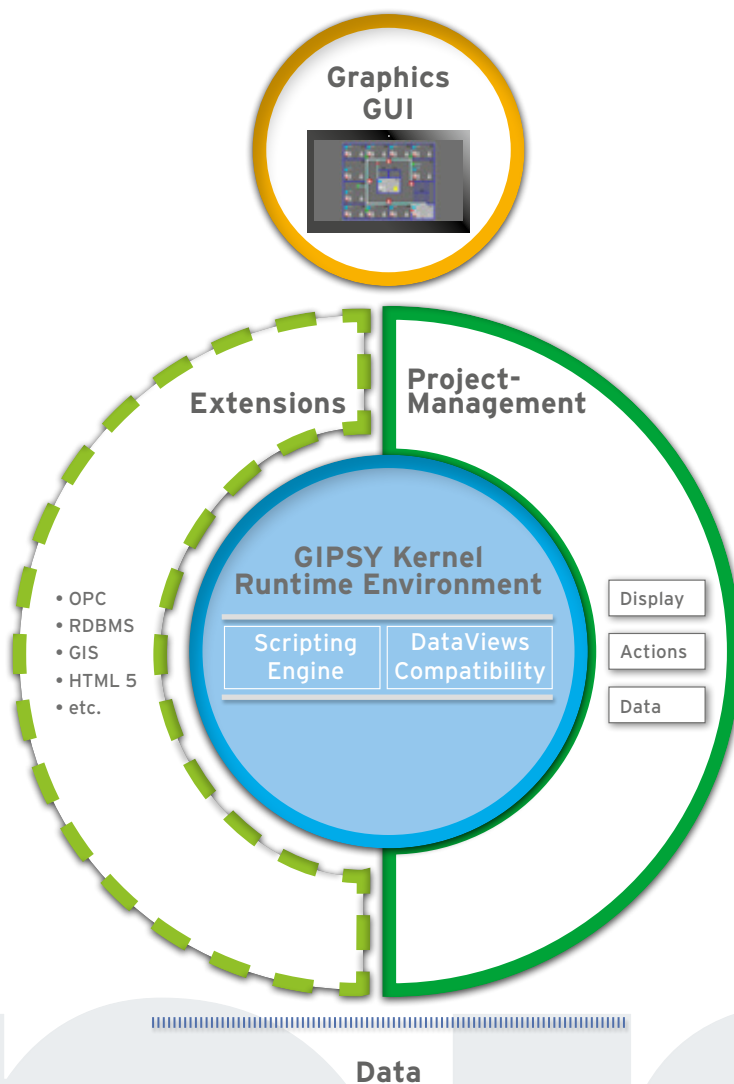
GIPSY®: Architectural design

The GIPSY® Server

The data-sources to be visualized, like real-time data, Archive/History systems, ERP (SAP, Baan, etc.), Data Bases (Oracle, DB2, etc.) or Document Management Systems are connected to GIPSY® by means of the GIPSY® Server. It processes the data and prepares it for the platforms visualizing it. The GIPSY® Server contains various modules like archive, alarmlist, dynamic data and documentation each of which incorporates the technology to deal with the unique requirements of the various data sources. E.g. dealing with dynamically changing data in real-time is a matter of efficient algorithms handling the high rate of data, whereas handling archived data requires managing vast quantities of data sets in a timely manner.
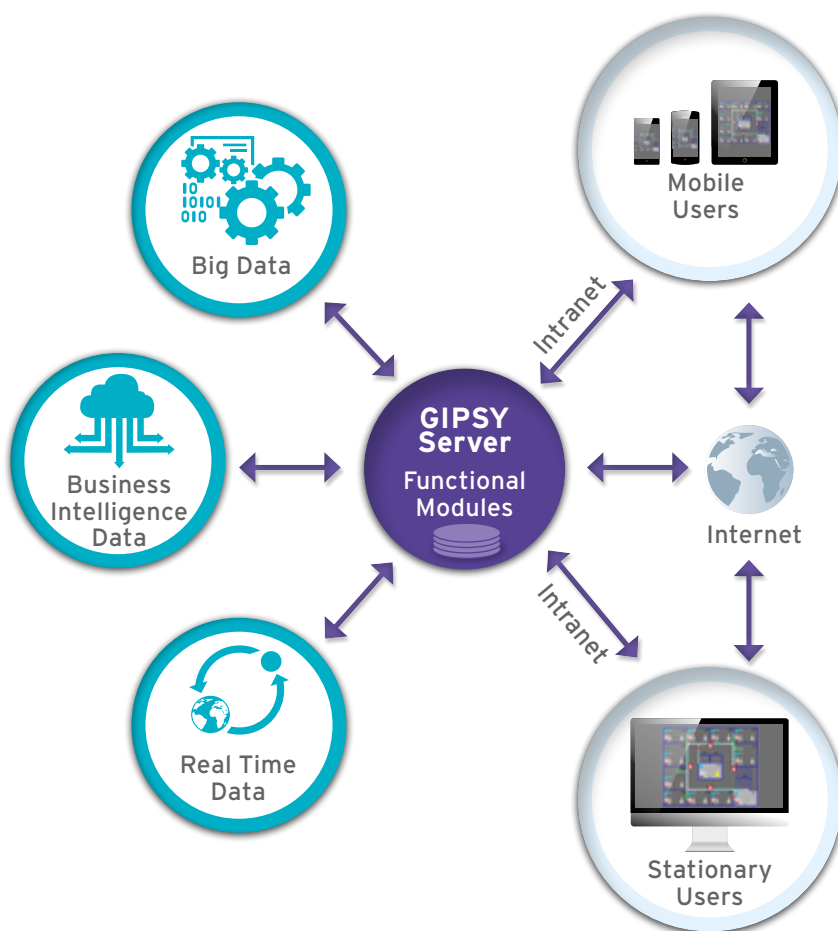
GIPSY® Server: Central component connecting data-sources to GIPSY®

The GIPSY® Server consists of 3 main components:

1 <u>GPS – the GIPSY® Project Server, maintaining all project relevant data, including graphics</u>

- Manage/broker all Project Data (View, Data, Action, Dialog)
- Import/Export (XML, DV, via XML)
- Version/Change Management

2 <u>GDS – the GIPSY® Data Server, acting as system-wide real-time database</u>

- Global Data Server
- Protocol Gateway (OPC, KNX, Custom Data Sources)
- Database Gateway (opt.)

3 <u>GAP – the GIPSY® Application Server, providing and – if need be – preparing graphics based on the data (changes) from the GDS</u>

- Content Delivery
- Client Management
- Security Gateway
- Data Broker
- Dialog Manager (opt.)
- Session Management

GPS
GIPSY
Project Server

GAP
GIPSY
Application
Server

GDS
GIPSY
Data Server

HTTP

HTTPS

iOS
Android
Browser
PC/Mac
Linux
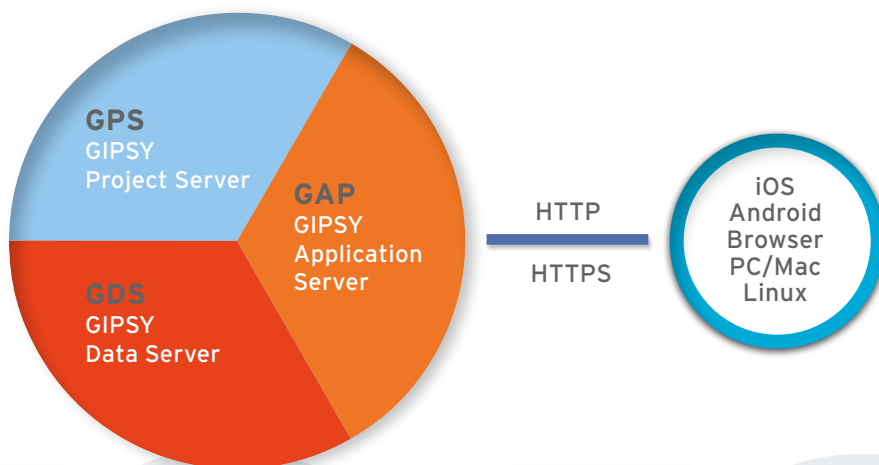
GIPSY® Server: Architectural design

On the client systems, be it a mobile phone, a tablet or a PC, the graphics are rendered employing the technology provided by the browser (SVG, WebGL).
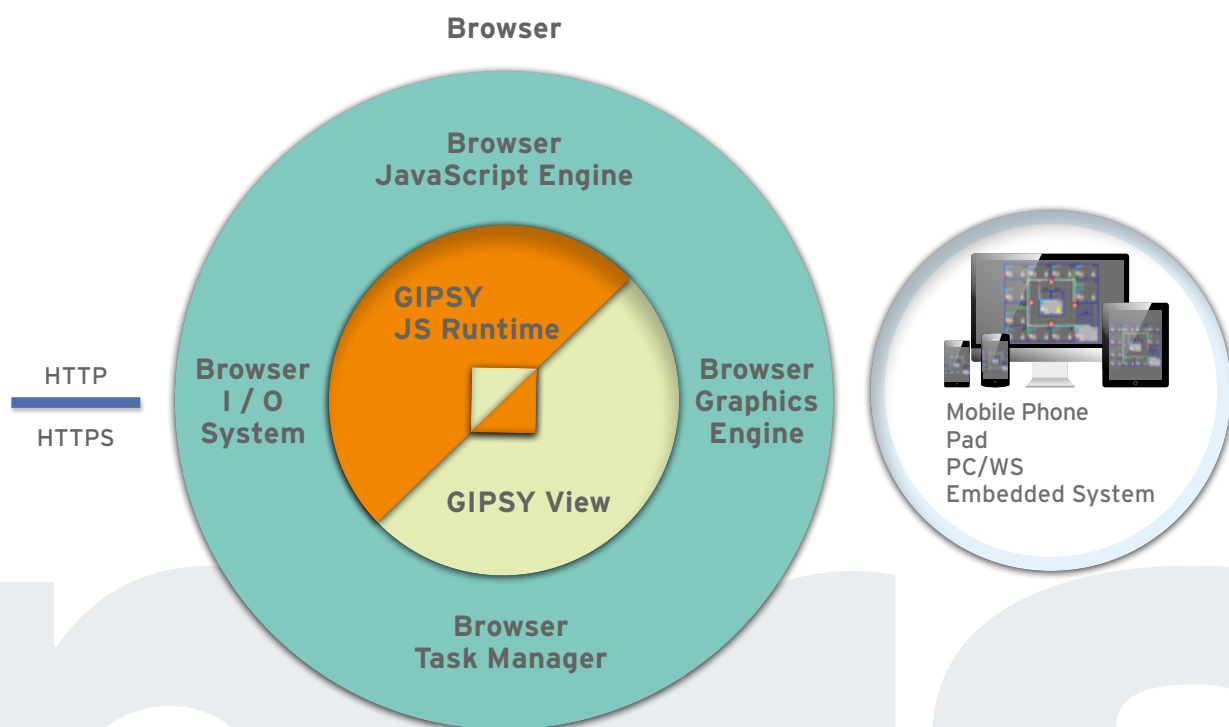
1 GIPSY JavaScript (JS) Runtime

• Dynamic SVG
• Global Data (DGS)
• Local Data
• Dialogs

2 GIPSY View

• Dynamic Anchors
• Data Anchors
• Dialog Anchors

3 Browser Graphics Engine

• SVG
• WebGL
• UI System

Browser

HTTP
HTTPS

Mobile Phone
Pad
PC/WS
Embedded System

GIPSY®: Rendering of graphics over a browser