

Andromeda Embedded Services Platform

Enabling the Embedded Internet

OVERVIEW

Galixsys Networks' Andromeda is a complete software solution to enable automated, real-time communication between networked devices. Built on top of the existing World Wide Web infrastructure, Andromeda offers a service capability for a range of device classes, from deeply embedded RTOS based systems to devices running a high level operating system such as Linux. This allows real-time communication between devices over standard web technologies. Via a patented binary-over-HTTP method, it offers the functionality of traditional XML-based web services without its processing overhead or network latencies.

BENEFITS

- ◆ Matched web client, server parser and framework, with a unique method to pass any general command and data over a standard HTTP interface.
- ◆ 100% ANSI C or Java based. Easily target any class of products on any instruction set architecture (ISA)
- ◆ Enhanced security above standard web security techniques via framed packet-based data transfer and device authentication.
- ◆ Allows the application-specific functionality of a custom TCP/IP application but the security, ease of maintenance and ease of integration of a general web client/server.
- ◆ Devices manage themselves in their own private network; block-chain architecture for devices.

How is Andromeda Used?

Andromeda addresses the fundamental embedded software requirements of devices making use of the Internet in a seamless and non-intrusive manner. With the ubiquity of low cost wireless interfaces now available, a plethora of devices once unable to be networked due to cost or infrastructure limitations are now able to have a network connection.

Although hardware costs and infrastructure barriers are fast disappearing, how these devices are actually able to make use of its new networked functionality needs to be addressed. Andromeda solves this by providing a means for the device application software to make general service calls to its hosts. With this service ability in place, devices and hosts are able to share and act upon requests without explicit knowledge or interaction by the end user.

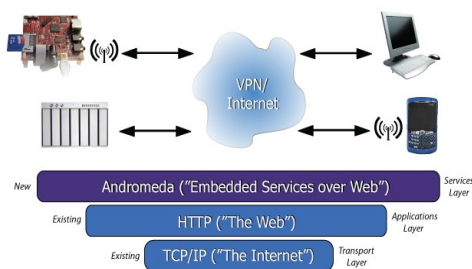
Andromeda can enable real-time control for devices in a variety of applications, including:

- ◆ Sensors, monitors, or controllers with automatic storage and retrieval of captured or generated data.
- ◆ Robotic or device artificial intelligence (AI) enhancement via server or cloud computing.
- ◆ Digital still cameras or video players with automatic upload or streaming of pictures and video.
- ◆ Remote monitors that need greater functionality or automation over web page serving.

How does Andromeda Work?

In order to facilitate automated communication, four major functions are provided:

- ◆ An embedded web *client*
- ◆ A web server *parser*
- ◆ A common *protocol* between client and server
- ◆ A *service handler* in the client and server



Add real-time over-the-web control to any class of devices, from PCs to portable electronics to remote monitors.

KEY FEATURES

The combined use of each of these major functions allows automated, real-time communication to occur, as well as provides the means to integrate into a device's software stack and the host's IT infrastructure.

Andromeda Web Client

- ◆ A standard web client that replaces the user interface components of a web browser with the Andromeda Protocol and Service Handler engines.
- ◆ Support for HTTP1.0 and 1.1, including persistent or chunk responses over IPv4 or IPv6. TLS support included.
- ◆ Available in stand-alone or library format for a variety of platforms. Packages exist for Intel and ARM based Linux devices, and libraries exist for glib, Android and Arduino.

Andromeda Parser

- ◆ Runs as a common gateway interface (CGI) program or as a module inside a standard web server.
- ◆ All functionality contained; no special server settings or features are required. No new TCP/IP ports are required to be opened.
- ◆ Packages exist for Intel and ARM based Linux devices and validated on Apache 2 web servers. Portable to a variety of systems.

Andromeda Protocol

- ◆ Based on a unique technique to frame general commands and data as part of the HTTP data payload.
- ◆ Runs as matched engines in both the Andromeda Client and Parser.
- ◆ Special paging mode supplied that allows the server to be the communication master, if desired.

Andromeda Service Handler

- ◆ Interfaces the Andromeda core functions with the device and server application suites.
- ◆ Uniquely identifies and tracks each device that connects to it and it connects to; block-chain architecture for devices. No 'master server' required.
- ◆ Standard calling mechanisms on the client (OS service call or linked library), and interfaces to the host (file system write, database interface, etc).

Key Features

- ◆ **Network Physical Layer Agnostic.** As the bridge and control point between a device's application software layer and the physical network connection, the software architecture of Andromeda is such that any physical network medium, be it cellular (4G/LTE), WiFi (802.11), ZigBee (802.15) or physical (Ethernet), is supported.
- ◆ **Enhanced Security.** As Andromeda runs within an existing web infrastructure environment, all security enhancements in place carry over to Andromeda. Further, the Andromeda API allows for the inclusion of unique identifiers in each packet sent, adding another security mechanism above standard web practices.
- ◆ **Extremely Flexible.** With the unique ability to support a general command and data packet over HTTP, any sort of device command can be initiated across the network. The web becomes a general data pipe without the processing overhead, server and infrastructure requirements of XML-based solutions.
- ◆ **Easy Integration and Maintenance.** As a web server module, Andromeda Parser plugs directly into the existing web IT infrastructure. Andromeda Client is completely OS and processor agnostic and requires no special libraries or hardware functions.

Product System Requirements

A key benefit of Andromeda is that great care has been taken to avoid dependencies on any other system function or third-party tools and software. With a pure ANSI C code base, Andromeda, both client and parser, is able to run in the deepest of embedded systems.

Andromeda is provided as a binary for both the client and server for any desired platform, and contains both native Andromeda Services as well as support for user-defined services.

For additional information on Andromeda and the services provided by Galixsys Networks, visit <http://www.galixsysnetworks.com> or e-mail info@galixsysnetworks.com