GainSpan Provisioning Application Development Kit

PRODUCT OVERVIEW

The GainSpan Provisioning Application Development Kit (ADK) is a complete solution that enables provisioning and configuration of GainSpan GS1011 SoC based GS1011M and GS1500M Wi-Fi modules. The Provisioning ADK can be used during installation or for configuring GainSpan Wi-Fi modules during normal operation. The Provisioning ADK enables rapid deployment of GainSpan Wi-Fi modules by allowing users to quickly configure their wireless security and network options using either smartphones (iOS or Android based) or PCs (web browser). The Provisioning ADK provides a complete suite of embedded and mobile platform application APIs that greatly ease development of customized provisioning and configuration features.

Smartphones and PC web browsers use mDNS/DNS-SD based methods to discover provisioning devices and services available on the wireless network. The GainSpan Provisioning ADK also allows automation of provisioning and system configuration in applications where multiple devices need to be provisioned without human interaction.

OPERATIONAL MODES AND DEPLOYMENT CASES

The GainSpan Provisioning ADK can be used to provision and configure GainSpan Wi-Fi modules for operation in "Limited AP" or in a Client/Station mode in conjunction with an existing infrastructure network.

In Limited AP mode, the GainSpan Wi-Fi module has the ability to form a connection with up to eight smart phones (or PCs) and each smartphone (or PC) connects to it as a client/station. The Provisioning ADK software suite allows configuration of the SSID, selection and configuration of security options such as WEP/WPA2 Personal, and authentication for these security modes. Advanced features support configuration of Wi-Fi beacon interval, a DHCP Server (that provides the IP address to the associated client) and a DNS server.

In Infrastructure Client Mode, the GainSpan embedded application includes a DHCP and DNS client and supports Open, WEP/WPA2 Personal and Enterprise security. Provisioning and configuring for client mode is achieved by initially bringing up the GainSpan Wi-Fi module as a Limited AP, and then using the GainSpan Provisioning ADK, to configure the module (temporarily operating in Limited AP) to connect to a specified AP as its client. This can be done in several different ways – using virtual WPS Push Button or Pin method (for devices that do not have access to a button), by scanning for all APs in the vicinity, or by manually entering the wireless network parameters of a known AP.
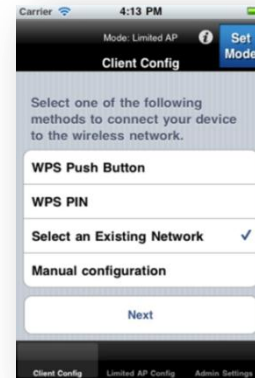
BENEFITS:

- **Complete Provisioning and Configuration solution using mobile smartphones or a web browsers.**
- **Single application that allows device provisioning and system configuration.**
- **Provides embedded and mobile platform APIs that allow customized provisioning solutions.**
- **mDNS/DNS-SD methods support discovery of devices and services available on the network without additional configuration.**
- **Allows for automation in provisioning and system configuration in applications using multiple devices.**
- **Support for provisioning in Limited AP mode to greatly simplify first time configuration and use.**

FEATURES:

- **Provisioning Software suite includes embedded Web, iOS and Android applications.**
- **Customers can use web browsers or iOS or Android based smartphones to provision and configure the node.**
- **Supports provisioning in Limited AP and Client modes.**
- **Supports Discovery by client applications using mDNS/DNS-SD**
- **Web and mobile APIs and reference applications available with source code.**

Additionally, the GainSpan Provisioning ADK may be used for system configuration during regular operation; to setup system identification and for HTTP server authentication.

Provisioning and configuration of Limited AP and client modes can be done using a web browser (PC based) or a iOS or Android mobile native application. Embedded web application pages are provided to work with a standard web browser. Source code is provided for iOS and Android based smartphone applications. Both the web and mobile native applications are based on a RESTful architecture supported by HTTP GET/POST methods using XML syntax.

mDNS/DNS-SD based discovery is supported in both Limited AP and client modes. The Provisioning embedded application advertises its availability and services using this technique. Smartphones discover and connect to this embedded Provisioning application. Discovery makes it easier to locate and connect to individual applications on a network and eliminates the need to know the URL. This is compatible with the Bonjour add-on for Microsoft Internet Explorer.

Over-the-air firmware updates of the GS1011M module-based SmartPlug can be performed using web or mobile applications provided in the GainSpan Over-the-Air Firmware Update ADK.

LIMITED AP PROVISIONING AND CONFIGURATION

Limited AP mode provisioning is used to configure the GainSpan Wi-Fi module as a Limited AP mode and can be done using either web or mobile provisioning applications. Configurable settings include:

- Unique SSID (of Limited AP)
- Channel number of Limited AP operation
- Security methods (Open, WEP, WPA/WPA2 Personal)
- Beacon Interval (of beacons transmitted by Limited AP)
- DHCP server settings
- DNS server settings
- DNS name (in lieu of an IP address to access the device)

CLIENT PROVISIONING AND CONFIGURATION

Client provisioning is used to configure the GainSpan Wi-Fi module to connect to an AP and is initiated in Limited AP mode. This includes configuration of Wireless and Network/IP layer settings, such as:

Wireless layer settings:

- Unique SSID of select AP
- Security method (Open, WEP, WPA/WPA2 Personal and Enterprise)

Network/IP layer settings:

- DHCP or Static IP address assignment
- IP address, Subnet, Gateway and DNS server settings in case of Static IP address assignment

The wireless and network/IP layer settings listed above may be configured using any of the following methods:

- *WPS Push Button:* This is displayed only if the device supports a WPS button. A "soft" button is made available via the provisioning application (mobile/web) that can be used in lieu of a physical button on the device. This is useful for devices that want to support provisioning via WPS Push button method but lack the physical interface or are installed in a location that is difficult to reach.
- *WPS PIN:* The provisioning application (mobile/web) functions as a virtual keypad for entry of PIN. This is useful for devices that want to support provisioning via WPS PIN method but lack the physical interface or are installed in a location that is difficult to reach.
- *Scan for Existing Access Points:* This option displays the APs available or visible to the GainSpan embedded device. Using the provisioning application (mobile/web), users select the AP to connect to. For the chosen AP settings, such as passphrase/key, are provided by the user.
- *Manual Configuration:* This option is used if user knows the network parameters of the AP that they want to connect to. All the configuration parameters are provided by the user.

SYSTEM CONFIGURATION

In addition to provisioning the GainSpan module in Limited AP or client modes, system configuration can also be performed using the provisioning application. These include:

- HTTP Server: Enabling/disabling security and setting the username/password for access control
- System Name: A user defined name can be assigned to the device
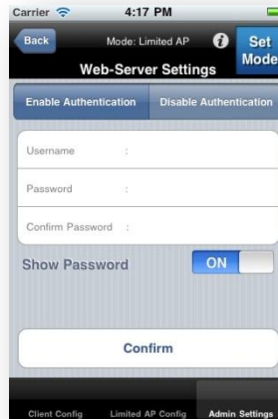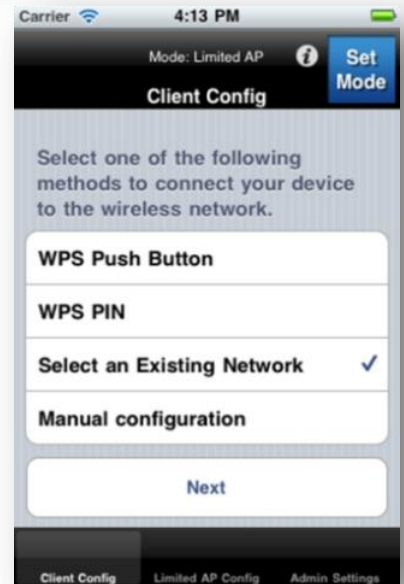
PROVISIONING ADK CONTENTS

ADK Components	Type
Provisioning Embedded Firmware Application	HTTP APIs & Firmware Binary/Source
Provisioning Web Application Software	Source & Binary
Provisioning Mobile Application Software for iOS/Android Smartphones	Source & Binary

PROVISIONING ADK MINIMUM REQUIREMENTS

Requirements	Type
GainSpan EVB II (or SDK II)	Hardware
PC with web browser or iOS or Android Based Smart Device	Client Device

GAINSPAN PROVISIONING ADK SOFTWARE COMPONENTS

PROVISIONING EMBEDDED FIRMWARE APPLICATION

GainSpan Provisioning embedded application APIs and features to enable the development of provisioning web and mobile applications.

- Provides RESTful HTTP API for application development
- Advertises provisioning profile and allows automatic discovery by client applications using mDNS/DNS-SD discovery methods
- Both web and mobile applications use mDNS/DNS-SD discovery to interact with the GainSpan Wi-Fi module

PROVISIONING EMBEDDED WEB APPLICATION

The Provisioning web application is an embedded application that resides on a GainSpan Wi-Fi module and can be accessed from any standard web browser. This application uses a web browser to provision the node in both Limited AP and client modes, to configure other system parameters. The web application is developed using JavaScript/AJAX.

PROVISIONING MOBILE APPLICATION

The Provisioning mobile application allows users to provision and configure devices using iOS and Android based smartphones. The mobile application software consists of two components:

- Provisioning APIs that allow development of provisioning and configuration applications
- Reference mobile applications illustrating the use of Provisioning APIs

GAINSPAN PROVISIONING ADK ORDERING INFORMATION

ITEM	PART NUMBER	Description
GainSpan Provisioning ADK	GS-ADK-Prov-WEB	GainSpan Provisioning ADK used with GainSpan GS1011M/GS1500M Wi-Fi modules