

GainSpan TLS Web Server Application Development Kit

OVERVIEW

The GainSpan TLS Web Server Application Development Kit (ADK) is a complete reference design package that demonstrates a Temperature and Light Sensor (TLS) application based on the GainSpan GS1011M/GS1500M Wi-Fi modules and associated embedded software suite. The TLS Web Server application works in conjunction with the GainSpan EVB II boards.

The GainSpan TLS Web Server ADK enables rapid development and deployment of sensor-based applications and provides a complete suite of embedded and mobile platform APIs that greatly ease, and shorten, development time for custom sensor applications.

The GainSpan TLS mobile applications provide the graphical interface for viewing sensor node data in time series graphs on iOS or Android based smartphones. The GainSpan TLS embedded application provides mDNS/DNS-SD based methods to discover sensor devices and services available on the wireless network.

OPERATIONAL MODES AND DEPLOYMENT CASES

The GainSpan TLS Web Server application may perform as a limited access point (Limited AP Mode) or as a client within an existing network infrastructure (Client/Station Mode).

In Limited AP Mode, the embedded sensor application forms a connection with up to eight smartphones (or PCs) as client/stations and allows configuration of a unique SSID (infrastructure network) with open or WPA/2 personal security, utilizing a DHCP Server to provide the IP addresses to each associated client smartphone or PC. The embedded sensor application also provides a DNS server. Once the smartphone or PC has established connection with the GainSpan Wi-Fi module (in Limited AP mode), the GainSpan TLS Web Server mobile application discovers and selects the TLS Web Server service profile advertised by the TLS embedded application and enables display of TLS sensor data in graphical form. *In Limited AP mode, the embedded sensor application sends out periodic Wi-Fi beacons and listens for probe requests and responses. The Limited AP mode also does not support client/station IEEE Power Save (PS) polling mode, and hence is not well suited for all power-sensitive applications.*

The Client/Station mode supports Wi-Fi layer Open, WPA/2 Personal and Enterprise security and network application layer DHCP and DNS client modes and can act as a SSL client creating a secure connection to phone/PC or internet server. This mode supports the IEEE PS-Polling mode (consumption of 110uA in Sleep Mode on GS1011M) and is suitable for low-power applications.

Provisioning of the GainSpan embedded device in Limited AP or Client/Station modes can be done using web or native mobile applications provided in the GainSpan Provisioning ADK.



BENEFITS:

- Complete Sensor reference application with charting function to monitor temperature and light sensor data using mobile smartphones
- Quick and easy way to develop wireless sensor applications with GainSpan Wi-Fi modules and embedded/mobile software suite
- Provides embedded and mobile platform APIs for customized sensor application development
- mDNS/DNS-SD methods support discovery of devices and services available on the network without additional configuration

FEATURES:

- TLS Software Suite including embedded firmware, web, iOS and Android applications
- TLS embedded application operates in both Limited AP and Infrastructure client modes
- TLS embedded application exposes the TLS resources using a HTTP server which can be accessed by web and mobile applications
- TLS embedded application advertises the TLS profile and allows automatic discovery by clients using mDNS/DNS-SD discovery methods
- Mobile Applications (iOS, Android) interact with the embedded application using discovery and HTTP API's and show the current state of the TLS resource and graphs of historical values collected during a session
- Charting function to monitor temperature, light, battery voltage and RSSI data over time



Charting on iOS-Based Smartphone



Both the Limited AP and client/station modes provide mDNS/DNS-SD based discovery methods. The TLS embedded application advertises availability, and clients automatically discover the TLS profile and connect to it. Discovery allows clients to locate and connect to TLS applications on the network without the need to know the URL.

The TLS application uses the embedded HTTP server functionality and responds to HTTP POST/GET requests initiated by a browser or a smartphone-based native application. Both the web and native applications are based on a RESTful architecture and communicate with the HTTP server using GET/POST methods and XML syntax. Built-in SmartPlug application web pages are provided to work with browsers. Source code is provided for native applications on both iOS and Android platforms.

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.

GAINSPAN TLS APPLICATION DISPLAY/CHARTS



TLS Web Application



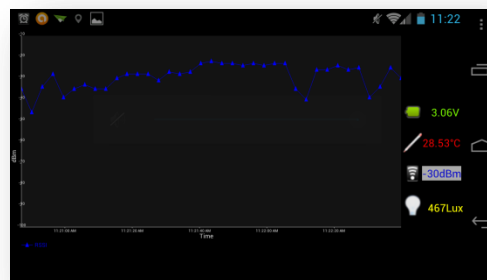
TLS Mobile Application (iOS)



TLS Mobile Application (Android)



Charting on iOS-based Smartphone



Charting on Android-based Smartphone

TLS WEB SERVER ADK CONTENTS

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

TLS WEB SERVER ADK MINIMUM REQUIREMENTS

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

GAINSPAN TLS WEB SERVER ADK SOFTWARE COMPONENTS

The GainSpan TLS Web Server ADK is based on RESTful HTTP APIs. TLS resources are represented as a URI and interaction with it is performed using HTTP GET method. The data is represented in XML syntax. The following software components are available as part of the GainSpan TLS Web Server ADK:

- **TLS EMBEDDED FIRMWARE APPLICATION**

Runs on the GainSpan EVB II and is the enabling application around which other client applications are built. This exposes the RESTful HTTP API and allows automatic discovery by client applications using mDNS/DNS-SD (Bonjour) discovery methods. The mobile and web applications leverage discovery and the RESTful HTTP API exposed by the TLS embedded firmware application, to fetch the state of TLS state variables.

- **TLS WEB APPLICATION**

Displays TLS state within a browser and automatically refreshes the state according to the user configurable interval. To enable service discovery, standard add-ons are available for Microsoft Internet Explorer (Bonjour Explorer bar) and Firefox (DNS-SD add-on).

- **TLS MOBILE APPLICATION**

These applications present the TLS state using a graphical interface. The graphical interface includes a charting function used to observe the variation of the TLS state variables over time. The applications allow the user to control the frequency of updates and other parameters related to charting.

GAINSPAN TLS HARDWARE

The GainSpan TLS Web Server ADK uses a GS1011M based Evaluation Board (EVB II) designed with photo and temperature sensors for wireless sensor applications. The GainSpan TLS application software represents the state of the following variables on the GainSpan evaluation board (EVB II).

- Ambient Temperature (in Celsius)
- Ambient Light (in Lux)
- Signal Strength (RSSI of last received packet in dBm)
- Battery Voltage (or line voltage if line powered, in Volts)

TLS WEB SERVER ADK ORDERING INFORMATION

ITEM	PART NUMBER	Description
GainSpan TLS Web Server ADK	GS ADK-TLS-WEB	GainSpan TLS Web Server ADK based on GainSpan GS1011M Wi-Fi modules

EVAL BOARD ORDERING INFORMATION

PART NUMBER	Description
GS1011MIP-EVB2-S2W-WEB	Serial to Wi-Fi Evaluation Board with – GS1011MIP module
GS1011MIE-EVB2-S2W-WEB	Serial to Wi-Fi Evaluation Board with – GS1011MIE module
GS1011MEP-EVB2-S2W-WEB	Serial to Wi-Fi Evaluation Board with – GS1011MEP module
GS1011MEE-EVB2-S2W-WEB	Serial to Wi-Fi Evaluation Board with – GS1011MEE module
GS1500M-EVB-S2W-WEB	Serial to Wi-Fi Evaluation Board with – GS1500M module

