

Welch Allyn Connectivity SDK Development

Best practices

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Welch Allyn, Inc.

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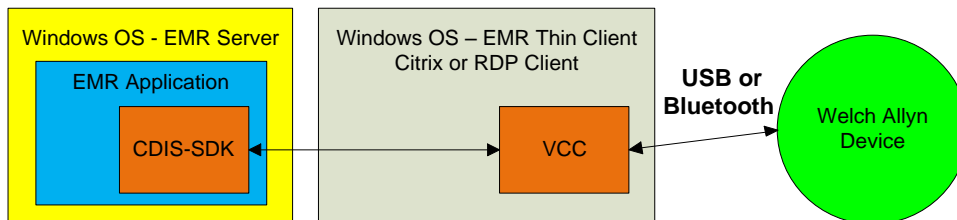
Introduction

This document describes

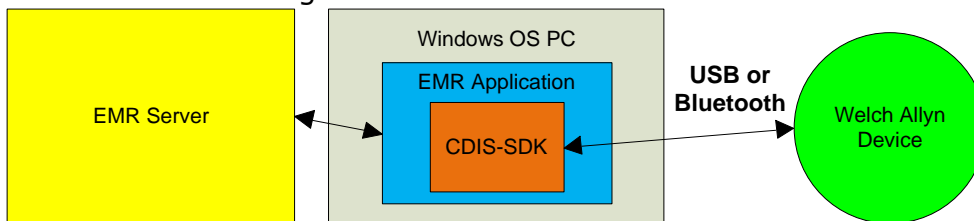
1. Supported workflow and transports available
2. Select an SDK interface technology that is best for the integration development environment or integration goals
3. Best practices to integrate the Welch Allyn Connectivity SDK to connect Welch Allyn vitals devices into a software solution.

Solution Selection

Thin Client block diagram



Thick Client block diagram



EMR Driven Workflow

The SDK Supports an EMR or application driven workflow.

Please see the diagrams below.

Vital Signs Clinical Workflow

1. Clinician logs into EMR
2. Clinician selects patient record within EMR
3. Clinician selects device from a list (optional for Bluetooth)
4. Clinician takes vital signs on the device
5. Clinician enters manual parameters/modifiers on the device
6. Clinician selects "acquire" (or similar) within the EMR software to pull vitals data from the device into the EMR.
7. Vitals data is now available in patient record

Batch Workflow

A batch workflow is only recommended when each vital signs capture (collection of vitals data like NIBP, Temperature, Pulse and SpO2 values) contains patient identification. If several readings are taken across patients without each reading being tightly identified by patient, then it is unclear which reading goes with each patient during the data import process. When the patient ID is not bound to each vital sign value there is a high risk of storing one patient's vital signs data into the wrong patient's chart.

A batch workflow is best applied where the workflow consists of the following steps.

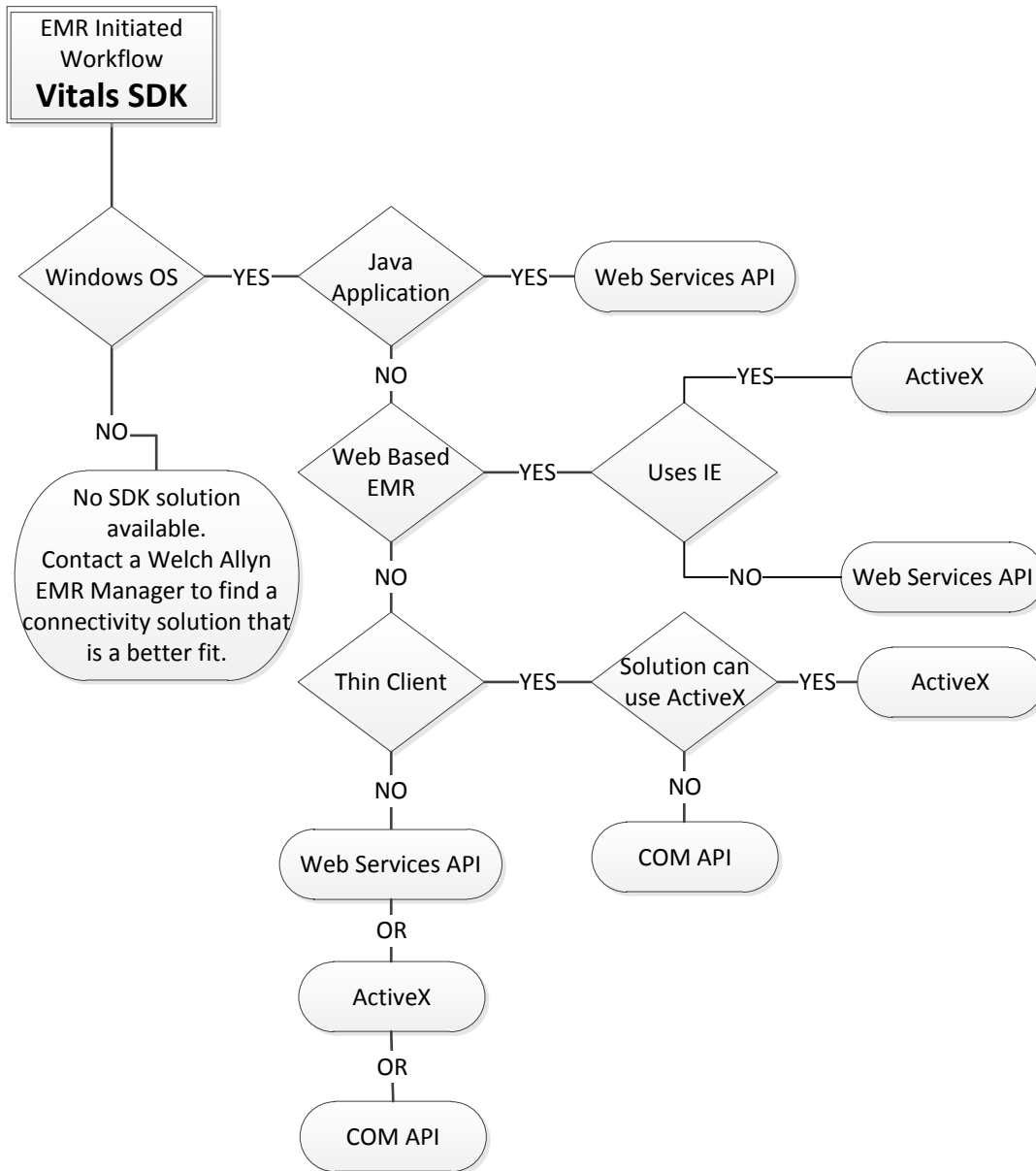
1. Clinician scans patient ID on the device
2. Clinician takes vital signs on the device
3. Clinician enters manual parameters/modifiers on the device
4. Clinician presses the "save" button on the device
5. Steps 1 – 4 are repeated for each patient until all vitals are taken.
6. Device now has all the vital signs for all patients on the rounds
7. Device is now connected to a PC containing the EMR software (with SDK integrated)
8. The clinician uploads all the saved vital signs from the device to the EMR.
NOTE: The vital signs are sent with patient ID so there is no chance of sending patient 1's data to patient 2's record.

NOTE:

If these workflow options do not describe the desired implementation please contact a Welch Allyn EMR Manager to find a connectivity solution that is a better fit.

Welch Allyn Vitals Connectivity SDK Interface Technology Driven Selection

The following diagram is intended to give guidance to which SDK solution (COM API, ActiveX or Web Services API) to use depending on the intended technology environment or integration goals. The chart is for guidance, it is not intended to be absolute direction.



Devices supported by SDK

Supported Devices	Compatible Versions	Preferred Transports
Connex Spot Monitor (CSM)	SDK 3.0 or higher	USB; Bluetooth
Connex Vital Signs Monitor (CVSM)	SDK 2.3 or higher	USB
Connex Integrated Wall System (CIWS)	SDK 2.3 or higher	USB
Connex ProBP 3400	SDK 2.3 or higher	USB
Spot Vital Signs LXi	SDK 2.3 or higher	USB
Spot Vital Signs *	SDK 2.2 or higher	Serial
VSM 300 *	SDK 2.2 or higher	Serial
VSM 5200 *	SDK 2.2 or 2.3	Serial

* Legacy Support – Welch Allyn recommends Connex series device for new connected customers.

NOTE: CIWS contains the same software and hardware interfaces as CVSM.

Operating Systems

The SDK solutions are only supported on Windows operating systems.

If Mac, iPad, iPhone, Android, Linux or other OS integration is required, contact a Welch Allyn EMR Manager for an alternative solution.

Upgrade Path

The SDK technology has taken into account backward compatibility for ease of integration.

There are several upgrade options based on the changes desired.

1. To add support for Welch Allyn CSM supporting SDK 2.x feature set e.g. supporting features that were available in SDK 2.x via USB or Bluetooth.
 - a. Update SDK APIs to version 3.x - maintains existing features & interfaces.
 - b. Simplest upgrade path with no application software changes required.
 - c. Install the libraries only by using the SDK installation merge modules.
2. To add support for new devices and features
 - a. New features include custom modifiers / scores & blood pressure averaging
 - b. Application software changes required to integrate new features.
 - c. This new interface is able to be backward compatible with the existing devices.
 - d. Install full SDK for development and deploy using installation merge modules.

SDK Version 3.x Install Instructions

The install instructions address a few installation scenarios.

Please follow the instructions for the specific installation scenario listed.

1. Download the SDK zip file from the provided link.
2. Place the zip file in a new folder on the PC
3. Extract the SDK install image (contents of the zip file maintaining folder structure)
4. Installing the SDK API for the first time.
Developer intends to only use the SDK API Interface.
Go to [Basic Installation](#).
5. Developer currently uses the SDK 2.x API.
Developer intends to only use the SDK API Interface.
Updating developer's PC from SDK 2.x API to SDK 3.x API
Go to [Basic Installation](#)
6. Developer currently uses the SDK 2.x ActiveX control
Developer intends to continue to use the SDK 2.x ActiveX control interface but would like to support future devices.
Updating developer's PC with SDK 3.x, but would like to still use ActiveX 2.x
Go to [Basic Installation](#) and then [ActiveX 2.x Installation](#)
7. Updating production PC with SDK 3.x API libraries
Go to [Redistribution Packaging](#)

Basic Installation

1. Locate the Welch Allyn Connectivity SDK install image.
2. Run 'autoexec.exe' from the root directory.
3. Press 'Next' to continue.
4. Press 'Complete' installation
5. Press 'Next'.
6. Press 'Install' to continue.
7. If User Account Control (UAC) is enabled, click 'Yes' at the UAC prompt to continue.
8. The wizard begins the installation.
9. When the installation has completed, press 'Finish' to exit the wizard.

Redistribution Packaging

The redistribution content is used to deploy the SDK and USB driver technologies with the EMR software.

For redistribution, please refer to the SDK Help document which can be found in:

"C:\Program Files\Common Files\Welch Allyn\Connectivity SDK\Help"

The help topic for "Redistribution" can be found in the:

- a. Select "Contents" tab
- b. Selecting "Deployment"
- c. Select "Redistribution"

The redistribution installer files can be found in:

"C:\Program Files\Common Files\Welch Allyn\Connectivity SDK\Redist"

NOTE: Please make sure the USB drivers are also distributed with the SDK installation. The installation merge modules for the USB drivers are included in the SDK installation zip file. **It is expected that the SDK integrator distribute the USB drivers when distributing the SDK.**

ActiveX 2.x Installation

The SDK 3.0.x contains the API libraries and the ActiveX 3.0.x control (WA_Vitals3ActiveX). The WA_Vitals3 object is not backwards compatible with the application code that interfaces with the WA_Vitals2 object. The WA_Vitals2 object can still be used with SDK 3.0.x. This combination provides a backward compatible interface and allows connectivity to all currently supported devices and future devices. This is a good option to use to support the CSM device while updated interfaces are being developed.

If you would like to maintain the WA_Vitals2 interface but want to connect to "new" WA devices, you will need to install the SDK 3.0.x and then replace the WA_Vitals3 library with the WA_Vitals2 library. When using the WA_Vitals2 interfaces, the application will only be capable of consuming data that the WA_Vitals2 interface presents, e.g. no "new" features will be available with the WA_Vitals2 interface. If new features are required the application will need to migrate to the WA_Vitals3 interface.

To install the SDK 2.x ActiveX control (WA_Vitals2) on top of the SDK 3.0.x:

1. Save the SDK 2.x merge module files to another location prior to installing the Connectivity SDK 3.x.

The merge module files are typically found in

"%CommonProgramFiles%\Welch Allyn\Connectivity SDK\Redist".

Copy the Microsoft and WA_Vitals2ActiveX merge modules...
examples include:

- a. x86 Systems:
 - Microsoft_VC80_CRT_x86.msm
 - policy_8_0_Microsoft_VC80_CRT_x86.msm
 - WA_Vitals2ActiveX.msm
 - b. x64 Systems:
 - Microsoft_VC80_CRT_x86_x64.msm
 - policy_8_0_Microsoft_VC80_CRT_x86_x64.msm
 - WA_Vitals2ActiveX64.msm
2. Install the version 3.0.x of the Connectivity SDK
See Section 8 Basic Installation
 3. Build your application installer, including the 3.0.x files within the 'Redist' folder as well as the necessary Microsoft and Welch Allyn ActiveX file copied from step 1.
You must include both the Visual Studio runtimes from the files copied in step 1 in this section above and the Visual Studio runtimes from SDK version 3.0.x.

Sample Code

Sample code can be found in the SDK installation in the C:\Program Files\Common Files\Welch Allyn\Connectivity SDK\Samples folder.

Sample code is included for the following languages:

1. C#
2. ATL COM
3. Java Script
4. VB.NET
5. VB6
6. MFC
7. Delphi

Transport details

USB

Welch Allyn devices support USB 2.0 standards. Cable lengths beyond the USB standard are not supported.

Multiple applications can't communicate with a single device at the same time. Only one application can open the USB driver at a time.

The CSM device must use the minimum USB Driver of 1.9.11 with a date code of September 2014 or later.

Bluetooth

The SDK Bluetooth solution is only compatible with Microsoft Bluetooth stacks. When communicating with a CSM device the PC is required to have a Bluetooth stack version 2.1 or higher. The device must be previously paired with the PC prior to connecting for communications to operate properly.

The Bluetooth workflow requires the SDK application to be open and listening for Bluetooth connections prior to user initiating the Bluetooth connection on the device.

The EMR application should always disconnect the Bluetooth link after acquisition is completed or when a patient chart is closed.

The CSM's Bluetooth connection will not operate properly when Bluetooth and Ethernet are connected at the same time.

Custom Data

Contact a Welch Allyn EMR Manager for details.

NIBP Averaging

NIBP averaging is a feature where the device will send out an averaged NIBP reading and the readings that went into making the average. The average reading is indicated as the average. The SDK API provides all the values where the ActiveX control only provides the average value.

Contact a Welch Allyn EMR Manager for more details.

Best Heart Rate

The CVSM, CIWS and CSM devices have a concept called Best Heart Rate. Since there are multiple sources of heart / pulse rate, the HR object will represent the best representation of heart rate based on the sources available at a specified time. The sources include: NIBP or SpO2. When SpO2 is present it is selected as the best heart rate. If SpO2 is not present and NIBP is present will be selected as the best heart rate.

Thin Client

In a thin client (Microsoft Remote Desktop or Citrix) environment the SDK is installed on the server and Virtual Channel Client (VCC) (Microsoft Remote Desktop or Citrix) plug-in is installed on the thin client terminal.

The VCC software is available to integrators for development purposes only.

The VCC software is only supported on Windows thin client PCs (e.g. Citrix or Microsoft RDP clients).

The VCC software would be purchased from Welch Allyn by the end customer.
The development partner (typically an EMR company) should not re-distribute VCC unless authorized by Welch Allyn.