

# SmartServer IoT Node-RED Tutorial

*The Sequencing widget is available with SmartServer 2.8 and higher.*

The Sequencing widget allows SmartServer IoT CMS users to create 'sequence of operations' (also known as flows) to automate everyday processes and create instrument panels and dashboards for visualization. The Sequencing widget leverages Node-RED, an open-source, flow-based, programming tool. Node-RED provides the ability to create flows using function blocks called 'nodes' and a web-based user interface for connecting the nodes, eliminating the need to write code. A ready-to-use library of nodes allows you to quickly start creating sequences or flows that contain custom logic and/or display information on a web pages with UI elements for creating dashboards and visualization.

SmartServer IoT provides some custom built nodes for Node-RED (called IAP Input and IAP Output nodes) that allow you to interact with datapoints that exist in SmartServer IoT. In addition, the Sequencing widget allows you to easily apply contexts within the SmartServer IoT to flows in Node-RED in order to deploy those flows in a real world systems. This tutorial helps you get started using the [SmartServer CMS Sequencing widget](#).

This section consists of the following:

- [Tutorial Overview](#)
- [Prerequisites](#)
  - [SmartServer IoT](#)
  - [SmartServer IoT Starter Kit](#)
- [Dialog Github Repository](#)
- [References](#)
- [Next Step](#)

## Tutorial Overview

This tutorial comprises the sections and exercises listed below with the goal of helping you understand the basics of Node-RED and the Sequencing widget so that you can start to create your own flows using the SmartServer IoT. It is recommended that you proceed class-by-class, completing the exercises for each class, as follows:

### Class 1: Node-RED Primer

- Exercise 1.1 – Basic Node-RED Flow
- Exercise 1.2 – Basic Node-RED Dashboard Flow

### Class 2: IAP Nodes

- Exercise 2.1 – Using IAP Nodes

### Class 3: Dataflows

- Exercise 3.1 – Creating a Dataflow
- Exercise 3.2 – Replicating a Dataflow

### Class 4: Webflows

*VAV Instrumentation Dashboard with UI Control Elements*

- Exercise 4.1 – Room Web-controller Device Webflow



#### Notes:

**Flows** are Node-RED terminology for the drag-and-drop programming interface where nodes are linked together in a wire-sheet to create a sequence of operations or visualization. They were invented for programming IoT systems and is ideally suited for the types of custom programming that SmartServer IoT users need to create.

**Dataflows** consist only of Node-RED flows/sub-flows without a supporting web page, graphical user interface (GUI). Dataflows are used to create custom control logic for automating workflows.

**Webflows** consist of both the Node-RED flows/sub-flows and a supporting webpage GUI, which creates a custom, web design for facility management and operations, exposing monitoring, alarming, and metric-driven dashboards and control panels.

## Prerequisites

### SmartServer IoT

SmartServer IoT 2.8 or higher (see [SmartServer IoT Getting Started](#) for more information about setting up the SmartServer IoT).

## SmartServer IoT Starter Kit

The examples in this tutorial are based on the SmartServer IoT Starter Kit and will demonstrate the use of the Sequencing widget. Please contact your Dialog sales representative if you need access to a Starter Kit.

Refer to the [SmartServer IoT Starter Kit User's Guide](#) for details on how to set up and use this kit. In addition, more information on how to implement the Starter Kit as a basis for the flows is covered in [Class 2 - Contexts and IAP Nodes](#).

## Dialog Github Repository

The necessary configuration files and completed examples are found in the [Dialog github repository](#).

The github repository contains the following:

- Context file (Node-RED Tutorial folder)
- Node-RED flows used for the exercises (Node-RED Tutorial folder)
- EVB VAV application (LON Channel folder)

It is recommended that you create your own Node-RED flows for each exercise before using the provided Node-RED flows. Doing so will help you to learn the process for creating flows.

## References

- See [SmartServer IoT Starter Kit User's Guide](#) for more information about the Starter Kit.
- See [Creating Sequence of Operations](#) for more information about the Sequencing widget.
- See [Defining Contexts](#) for more information about the Planning widget and contexts.
- See [Defining Datapoint Properties](#) for information about creating and modifying datapoint properties.
- See [Testing Devices](#) for information about viewing datapoint properties.

## Next Step

Once the prerequisite and set-up conditions are met, continue with the [Introduction](#).