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Rapid IoT Application Development using the Web of Things

Second W3C Workshop on the Web of Things

4 June 2019

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1. Current Issues in IoT Application Development

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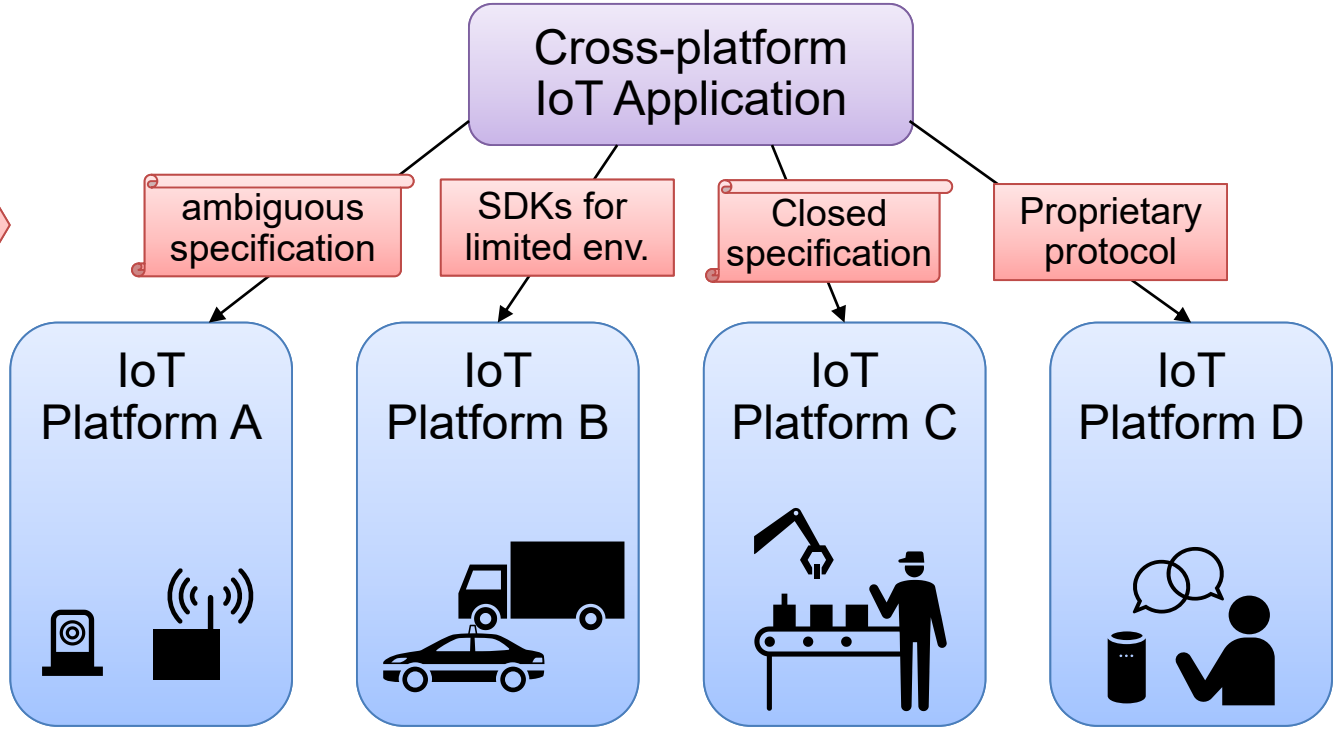
To connect things beyond their domain and platform, we must go through the barrier of interoperability.

Barriers against cross-platform collaboration



2. Web of Things Thing Description

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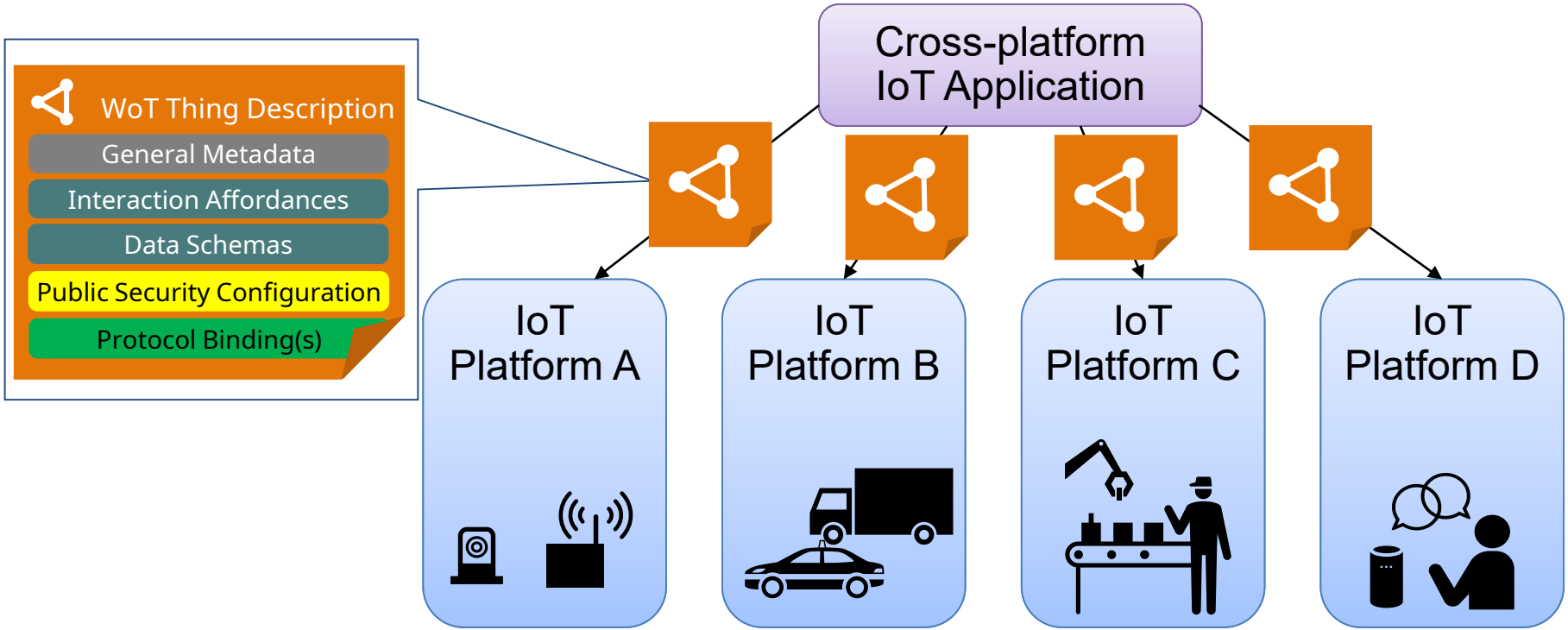
WoT Thing Description describes each IoT Platform and Things, and Applications use the TD as an open specification of each PF or Things.



3. Rapid IoT Application Development Environment

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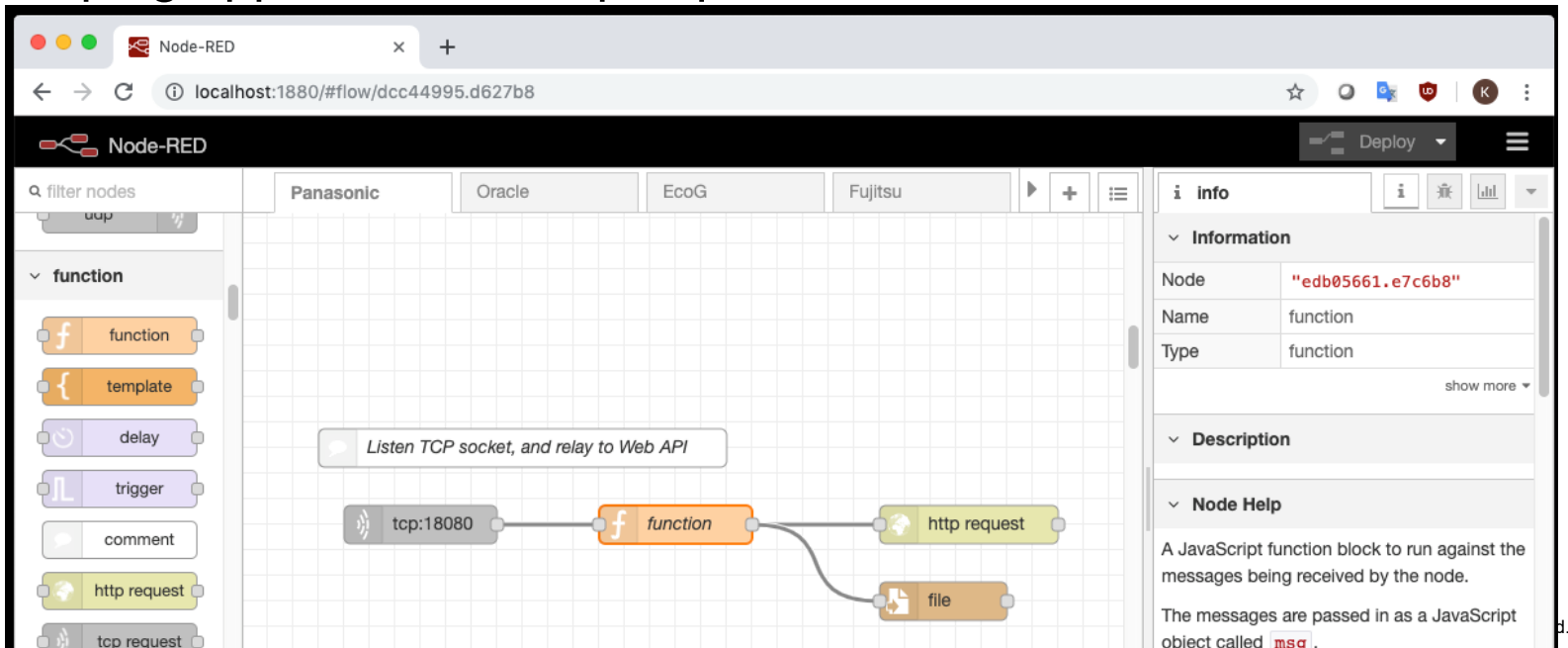
Node-RED is widely used in IoT application development field, because of its intuitive programming user interface.

- Node-RED is a flow-based programming environment for IoT application.
- Developing application is simple: place and connect the “nodes”.



3. Combine Node-RED with the Web of Things

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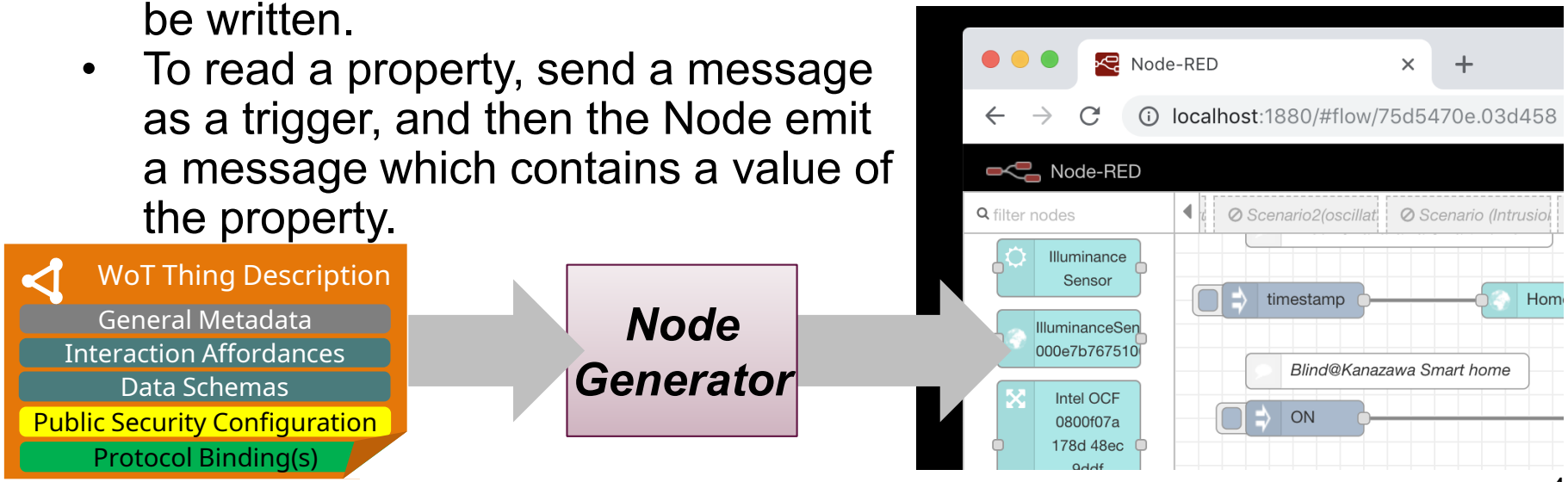
"Node Generator" simplifies IoT application development by generating Node module of Node-RED from a Thing Description

- By generating a Node, developer can handle a Node as an avatar of a Thing.
  - To write a property of the Thing, send message and its payload will be written.
  - To read a property, send a message as a trigger, and then the Node emit a message which contains a value of the property.



4-1. How to Use: Preparation

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1. Clone repository

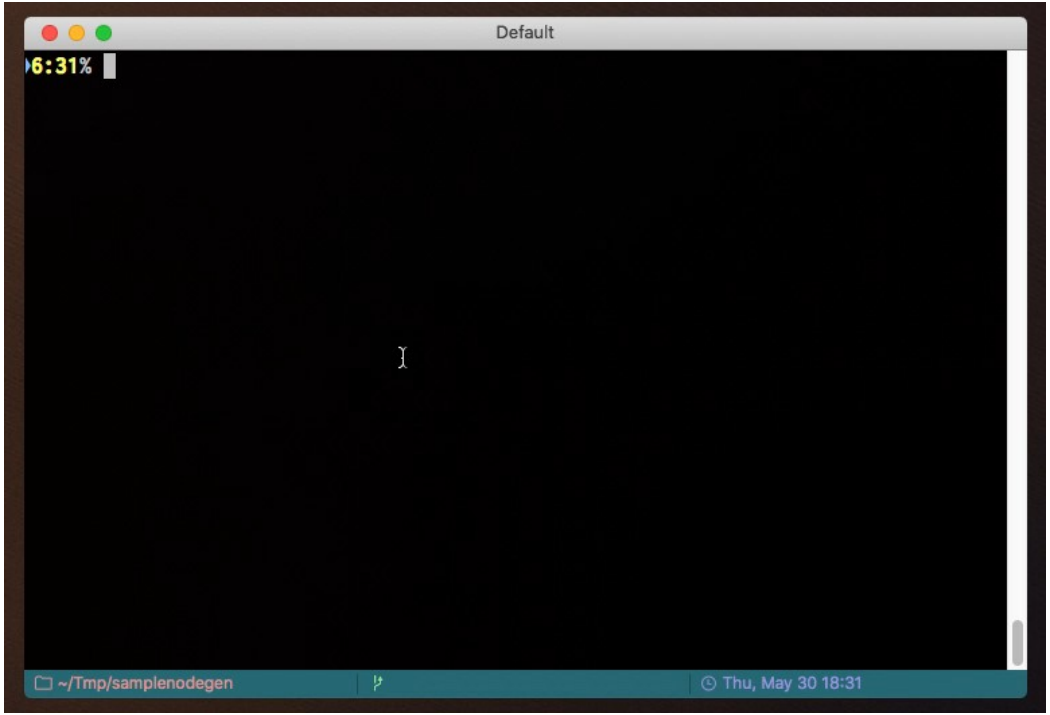
```
% git clone https://github.com/k-toumura/node-red-nodegen.git
% cd node-red-nodegen
% git checkout webofthings
```

2. Install dependent packages

```
% npm install
```

3. Run node-red-nodegen

```
% ./bin/node-red-nodegen.js
```



4-2. How to Use: Generate and Install a Node Module

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1. Generate a Node module

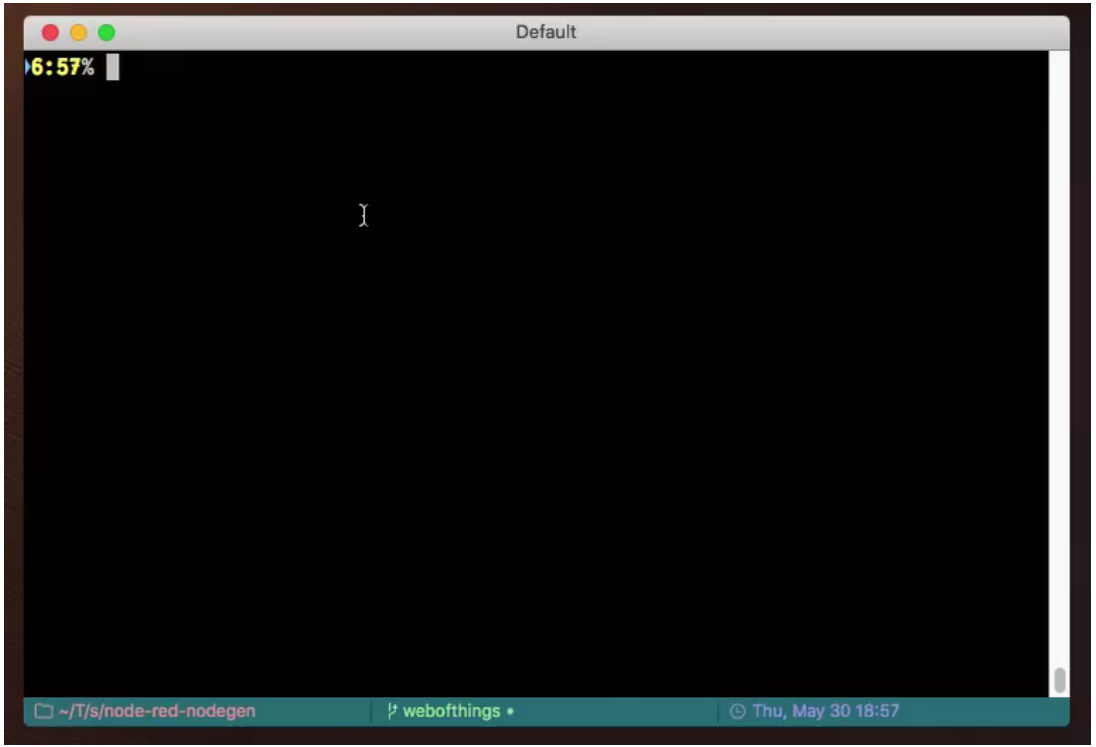
```
% ./bin/node-red-nodegen td.jsonld
```

2. Install dependent packages

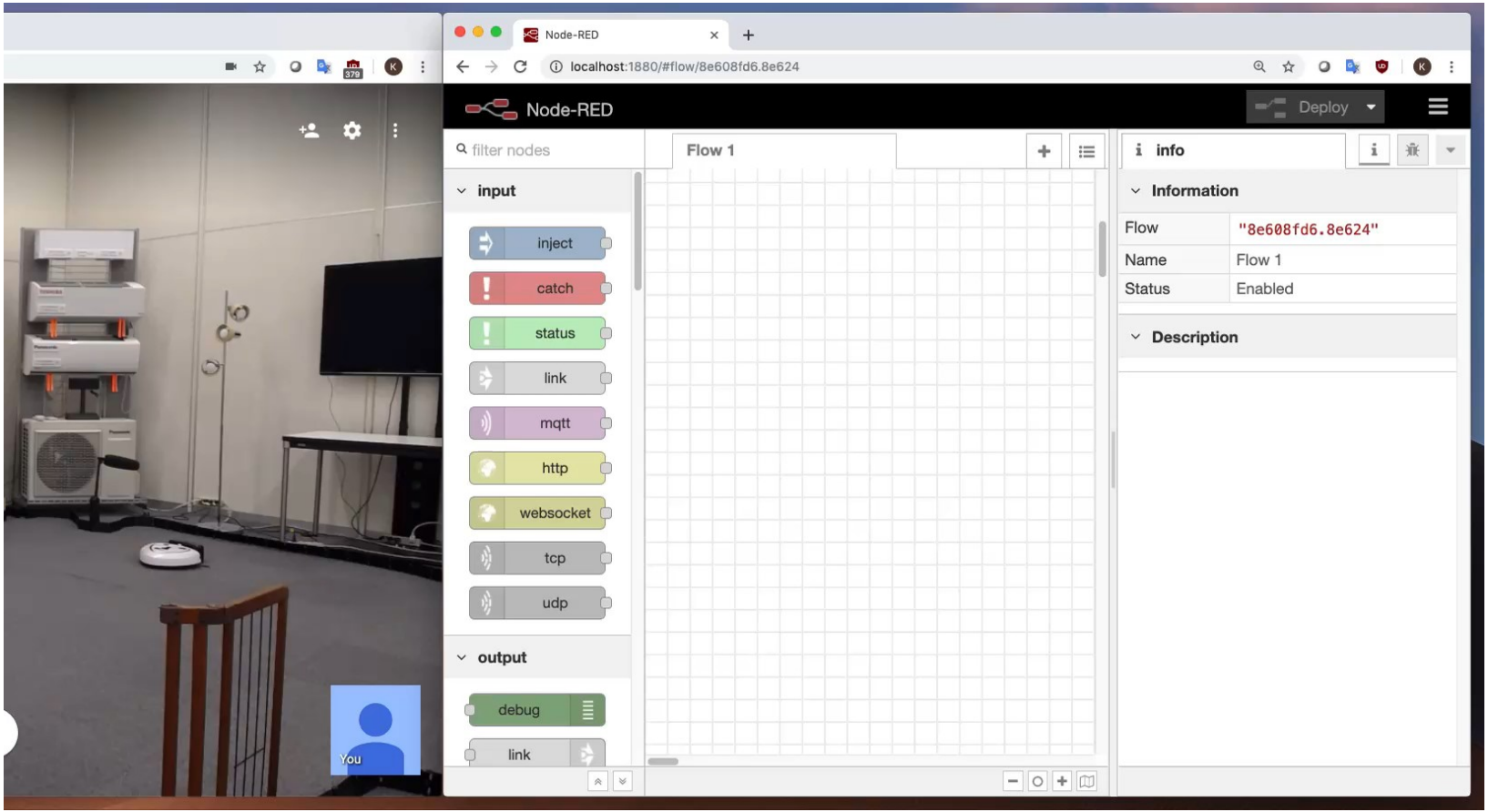
```
% cd ~/.node-red
% npm install
    generated-module-dir
```

3. Run Node-RED

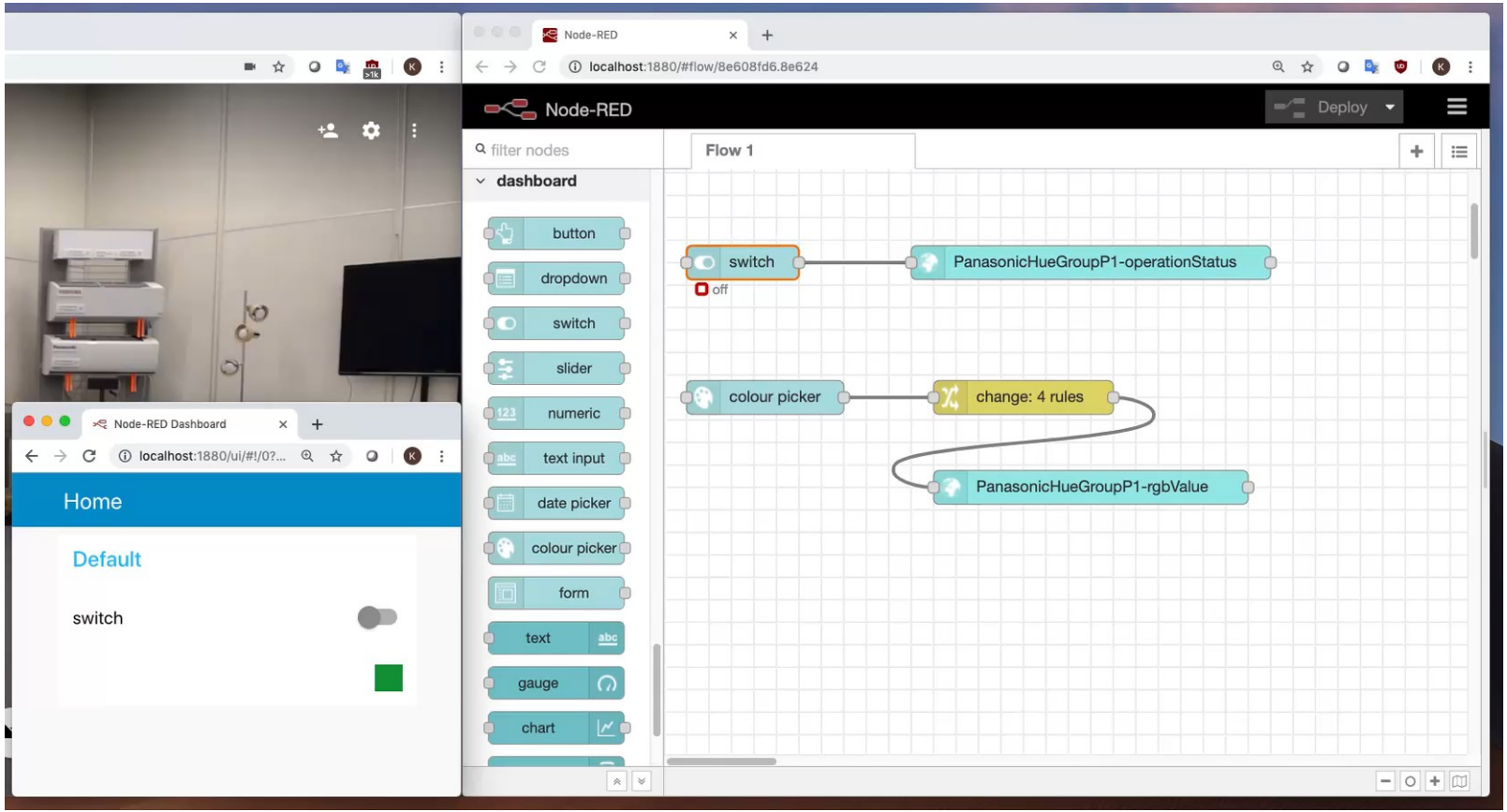
```
% node-red
```



4-3. How to Use: Write a Simple Application



4-4. How to Use: Control the Thing using Dashboard



5. Benefit of Node Generator

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Simplify device integration process in IoT Application Development

- Developers need not to care about details of network protocol to interact with Things.
  - Detailed information is encapsulated in Thing Description, and Node Generator use them to generate specific protocol binding codes.

- Developers can get appropriate information of Things from Editor UI.
  - need not to search another document separately
  - can concentrate to implement logics that create real customer values.

6. Current Issue and Future Directions

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Semantic Metadata may gain Developer's Productivity

- Semantic search/discovery of Thing Description
  - Recommend a related Node in Node-RED Editor UI
- Automatic reconciliation of message content between Nodes
  - Eliminate boilerplate coding for connecting Things
- Utilize Web links to incorporate other useful information of Things on Editor UI.
  - Manuals, pictures, contact person, support forum, etc.

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