

Design Concept

NEON IoT Platform and UHES Protocol for the IoT Devices

An unified protocol for all consumer electronics devices

The LE Company.
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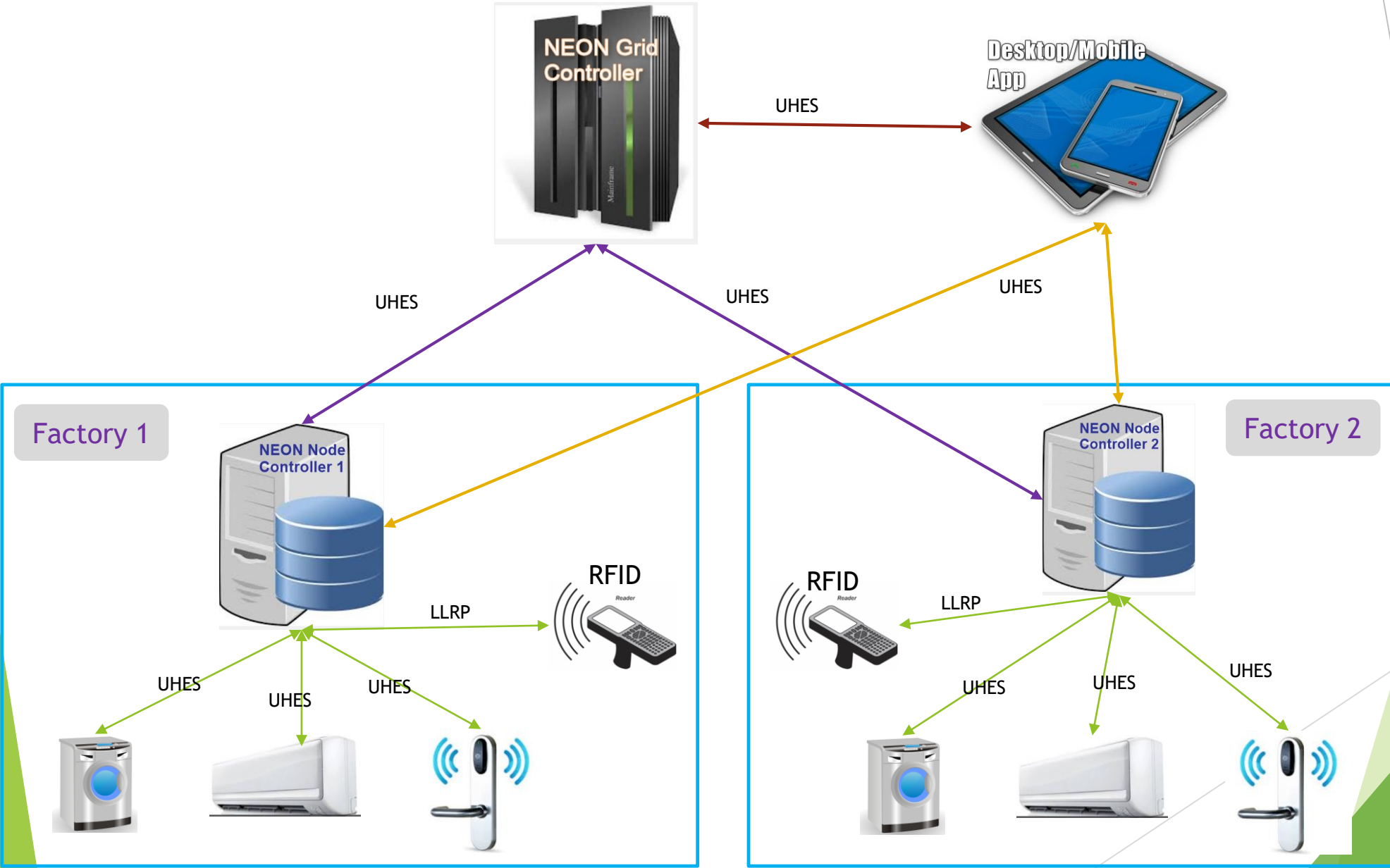
Introduction

- This document is an overview of the Neon IoT Platform and the UHES Protocol.
- If you are a IoT device maker and need to get more details, please visit us at www.lecompany.co OR via email info@lecompany.co
- For demonstration, please visit link below for details: <https://lecompany.co/demonstration-1>

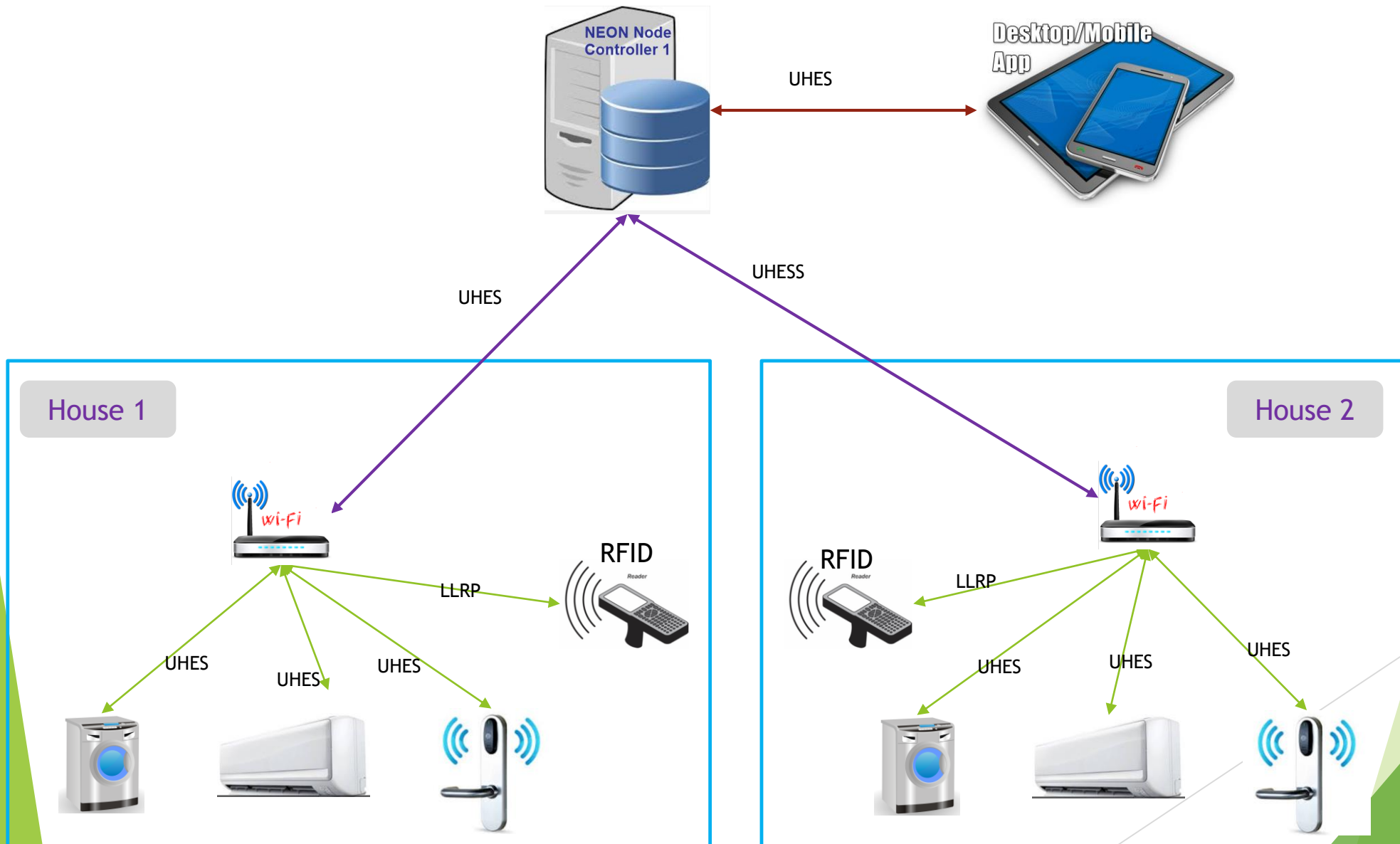
Neon IoT Platform Overview

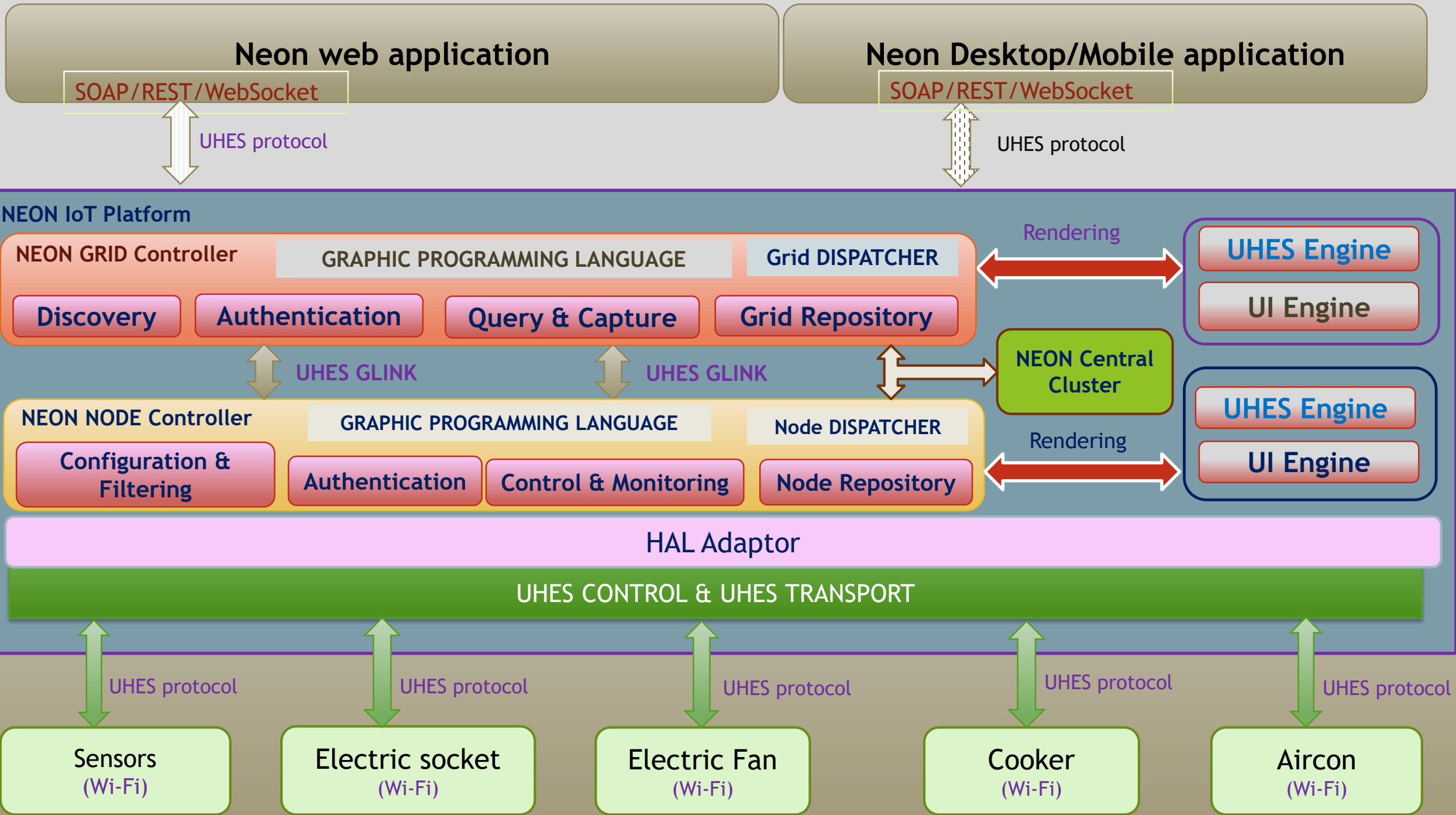
- **NEON IoT platform** is a system software that is implemented to support the **UHES protocol** which is designed specifically for the Internet of Things Device (short name: IoT device). The Neon IoT Platform consists a set of component software as middleware, server applications and design tool. The NEON IoT platform supports for both lightweight application (individual user) and enterprise application.
- For individual user, the user just simple logins to the Neon IoT Platform web application at www.neonplatform.com to access and manage their devices.
- For enterprise application as manufactory, warehouse... There needs to build and deploy a specific application depending on the requirements. Contact us for details.

Neon IoT Platform for Enterprise application



Neon IoT Platform for individual application





NEON IoT Platform Components

- **NEON IoT Platform** consists 3 main software components: **NEON Grid Controller**, **NEON Node Controller** and **NEON Central Cluster**.
- **NEON Grid Controller** is component on top of the Neon IoT Platform and is to manage the Grid which includes a set of Neon Node Controllers. The *NEON Grid Controller* is able to communicate with Neon Node Controllers via **UHES GLINK** protocol.
- **NEON Node Controller** is component at underlying of the NEON Grid Controller and its role is to communicate with physical devices via **UHES TRANSPORT** and **UHES CONTROL** protocol.
- NEON Grid Controller and NEON Node Controller are also able to communicate each other via either **UHES GLINK** protocol.
- **NEON Central Cluster** is a GUI application for controlling and monitoring others components in the Neon IoT Platform as Neon Grid Controller, Neon Node Controller or even physical devices in some special cases.

UHES Protocol Overview

- **UHES (Unified Home Electronics System)** protocol is specifically designed for all household IoT devices as Electric socket, Cooker, Electric fan, Aircon, Sensors...
- Via the UHES protocol, an application is able to communicate with any IoT device based on an **unique language** as long as that device is implemented to support the UHES protocol.
- Via UHES protocol, a IoT device is able to talk to a remote application what it has, what it can do. In otherwise, the remote application is able to talk to the device what it wants from that device.
- UHES protocol is also designed to secure data exchange between IoT devices and the remote application.

UHES Protocol Overview (cont.)

- **UHES protocol** is divided into three sub-protocols: UHES GLINK protocol, UHES TRANSPORT protocol and UHES CONTROL protocol.
- **UHES GLINK** protocol is a set of APIs and standards support for communication between the Neon Grid Controller and the Neon Node Controller.
- **UHES TRANSPORT** protocol is set of APIs and standards that help carry UHES CONTROL messages between the Neon Node Controller and physical IoT Devices. **Think about UHES TRANSPORT protocol is something similar as the HTTP protocol.**
- **UHES CONTROL** protocol is a describing language in the XML format to describe about physical features of a IoT device. UHES CONTROL protocol helps software applications (example: NEON Node Controller) directly access and control physical IoT devices if that device are implemented to support the UHES protocol. **Think about UHES CONTROL protocol is something similar as the HTML language.**
- A IoT device that implements the UHES protocol is called **UHES Device**.

UHES CONTROL Protocol Overview

- UHES CONTROL protocol is a part of the UHES protocol.
- UHES CONTROL protocol describes about capabilities of a UHES IoT device and how a software application is able to communicate with that device.
- There are 5 main objects in UHES CONTROL protocol: NODE, CNODE, UHES DEVICE, Page and Param.
 - **NODE** is a object that represents for a set of UHES devices. NODE lives on Neon Node Controller.
 - **CNODE** is mirror of a NODE living on the mobile application. CNODE is designed for security reason.
 - **UHES DEVICE** is a object that represents for a physical device on Neon Node Controller.
 - **Page** is a GUI form to display Params of UHES devices on the server application or mobile application.
 - **Param** is a standardized data structure in UHES CONTROL protocol that represents for one feature of device.
- Details of UHES CONTROL protocol is described in UHES protocol specification.

UHES TRANSPORT Protocol Overview

- UHES TRANSPORT protocol is a part of the UHES protocol.
- UHES TRANSPORT APIs is set of APIs and standards which are to package and carry the UHES CONTROL messages. UHES TRANSPORT is formed in JSON format with three types: SEND message, RESPONSE message and NOTIFY message. Details of UHES TRANSPORT protocol is described in the UHES protocol specification.
- Below is format of message for sending (**SEND** message) which NODE, CNODE or UHES Device uses to send a request message to the others.

Protocol ID	Priority	Des ID	Source ID	Session ID	Message ID	Function ID	Keyed Hash Checksum	Argument ID	Argument Value
UHES2@1.0@SND	1 hex digit	Hex string	Hex string	SHA2 Hash	UUID type	3 Hex digits	SHA2	5 Hex digits	ASCII string

- Below is format of message for response (**RESPONSE** message). RESPONSE message is used by the receiver to response back to its request (SEND message).

Protocol ID	Priority	Des ID	Source ID	Session ID	Message ID	Function ID	Keyed Hash Checksum	Argument ID	Argument Value
UHES2@1.0@RES	1 hex digit	Hex string	Hex string	SHA2 Hash	UUID type	3 Hex digits	SHA2	5 Hex digits	ASCII string

- Below is format of message for notify (**NOTIFY** message). NOTIFY message is used by sender to notify to receiver that need not the receiver response back.

Protocol ID	Priority	Des ID	Source ID	Session ID	Message ID	Function ID	Keyed Hash Checksum	Argument ID	Argument Value
UHES2@1.0@NTF	1 hex digit	Hex string	Hex string	SHA2 Hash	UUID type	3 Hex digits	SHA2	5 Hex digits	ASCII string

UHES GLINK Protocol Overview

UHES GLINK protocol is a part of the UHES protocol.

UHES GLINK protocol is specifically designed for the enterprise application to manage a large number of IoT devices. UHES GLINK helps for communication between the Neon Grid Controller and the Neon Node Controller

- There are 2 main objects in UHES GLINK protocol: GRID, CGRID.
- **GRID** is an object on Neon Grid Controller (NGC). Each GRID is set of NODEs. Via GRID, NGC is able to manage a large number of UHES devices on the IoT network. GRID lives on the NGC.
- **CGRID** is mirror of a GRID living on the mobile applications. CGRID is designed for security reason.
- Details of UHES GLINK protocol is described in UHES protocol specification.

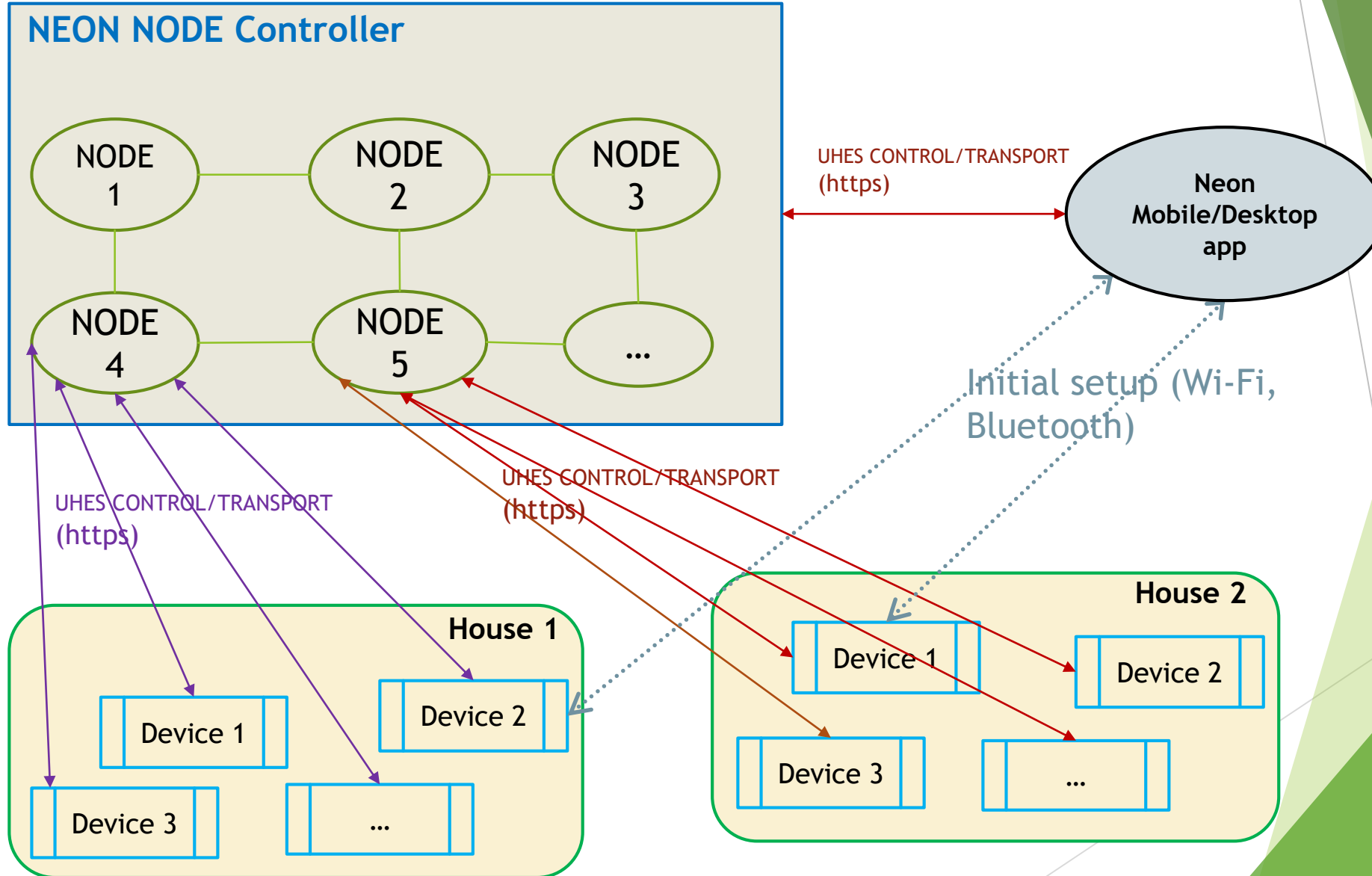
Graphic Programming Language

- **Neon IoT Platform** allows user to customize behavior of their devices via a easy and simple **graphic programming language**. Example:

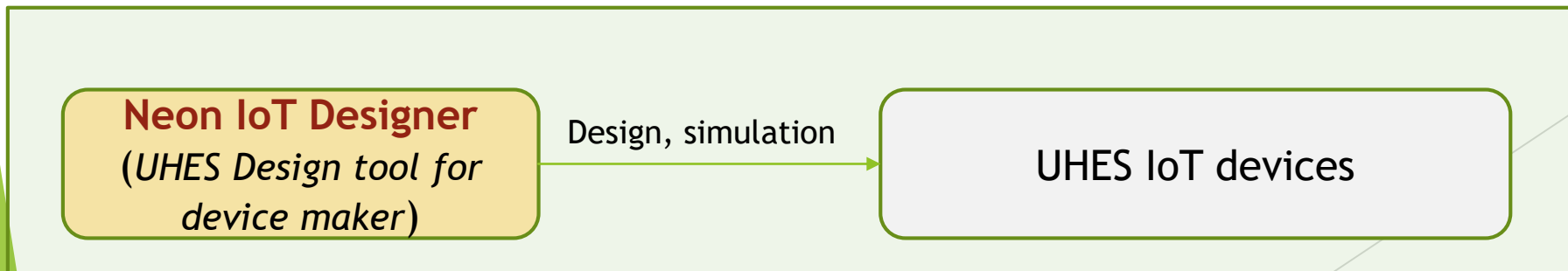
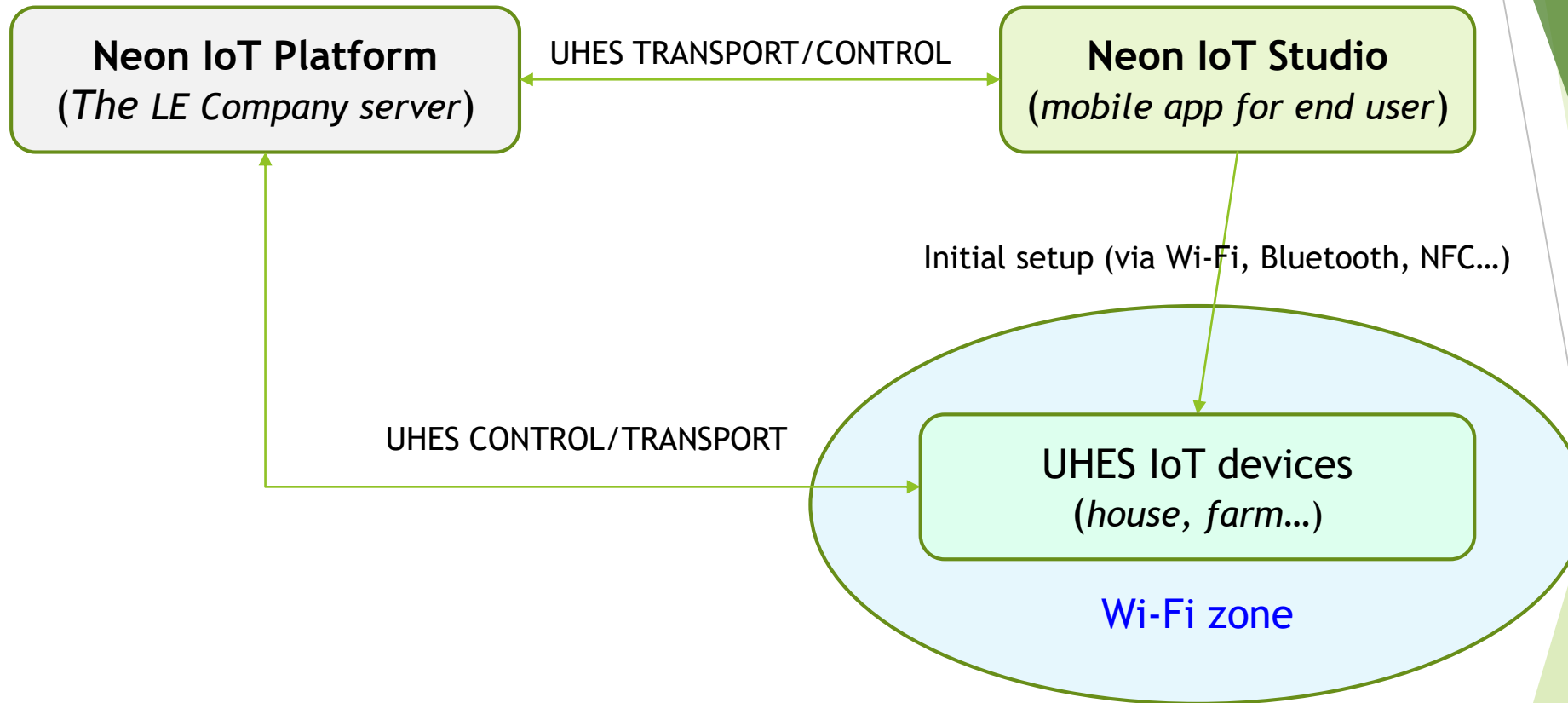
```
IF (ElectricSocket.Sensor_Temp = 50) DO [Fan.PowerButton= ON].
```

Note: above code is visualized by visual graphic UI components making it easy understanding for any user without having knowledge about software programming.

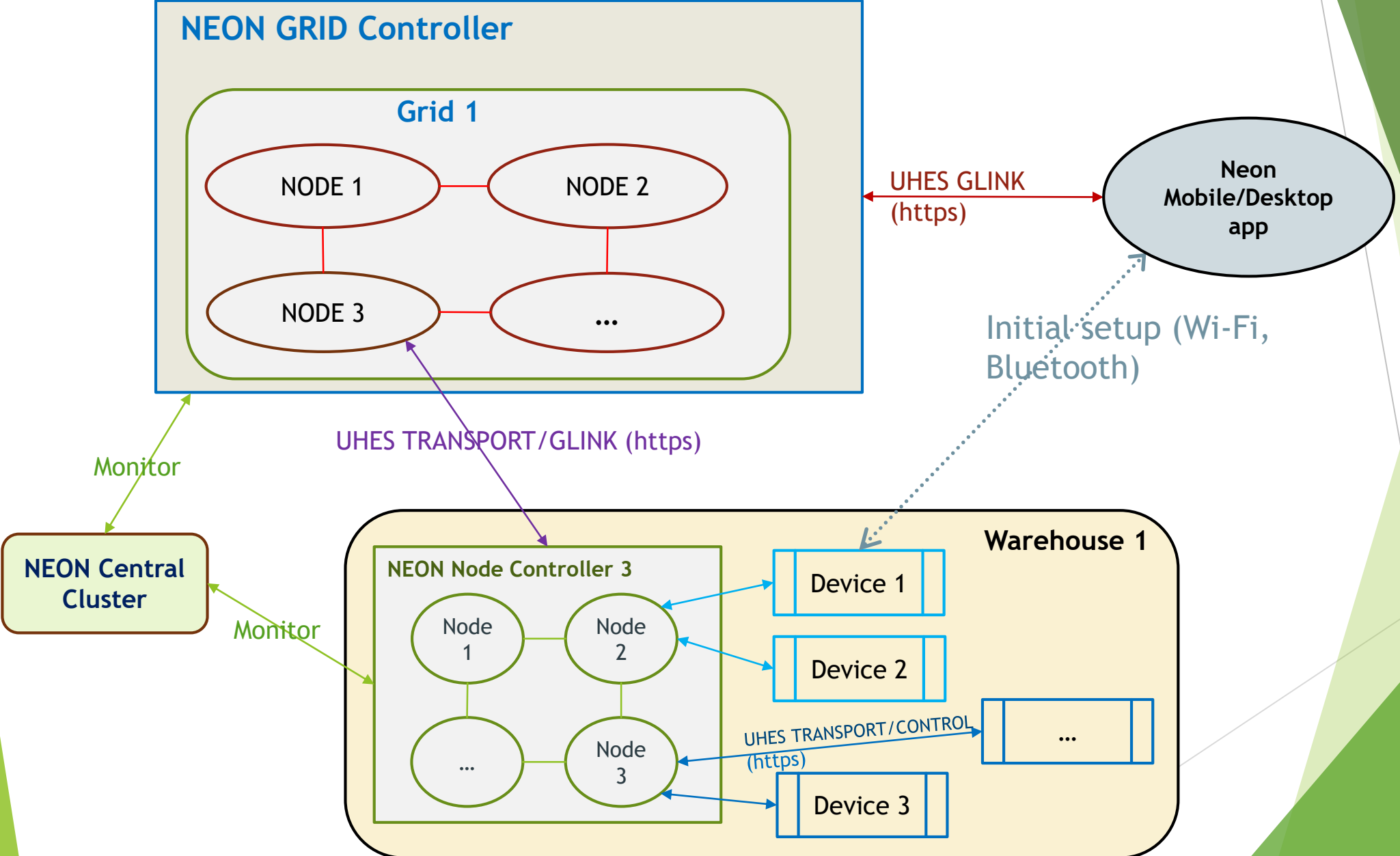
Deployment Strategies (lightweight)



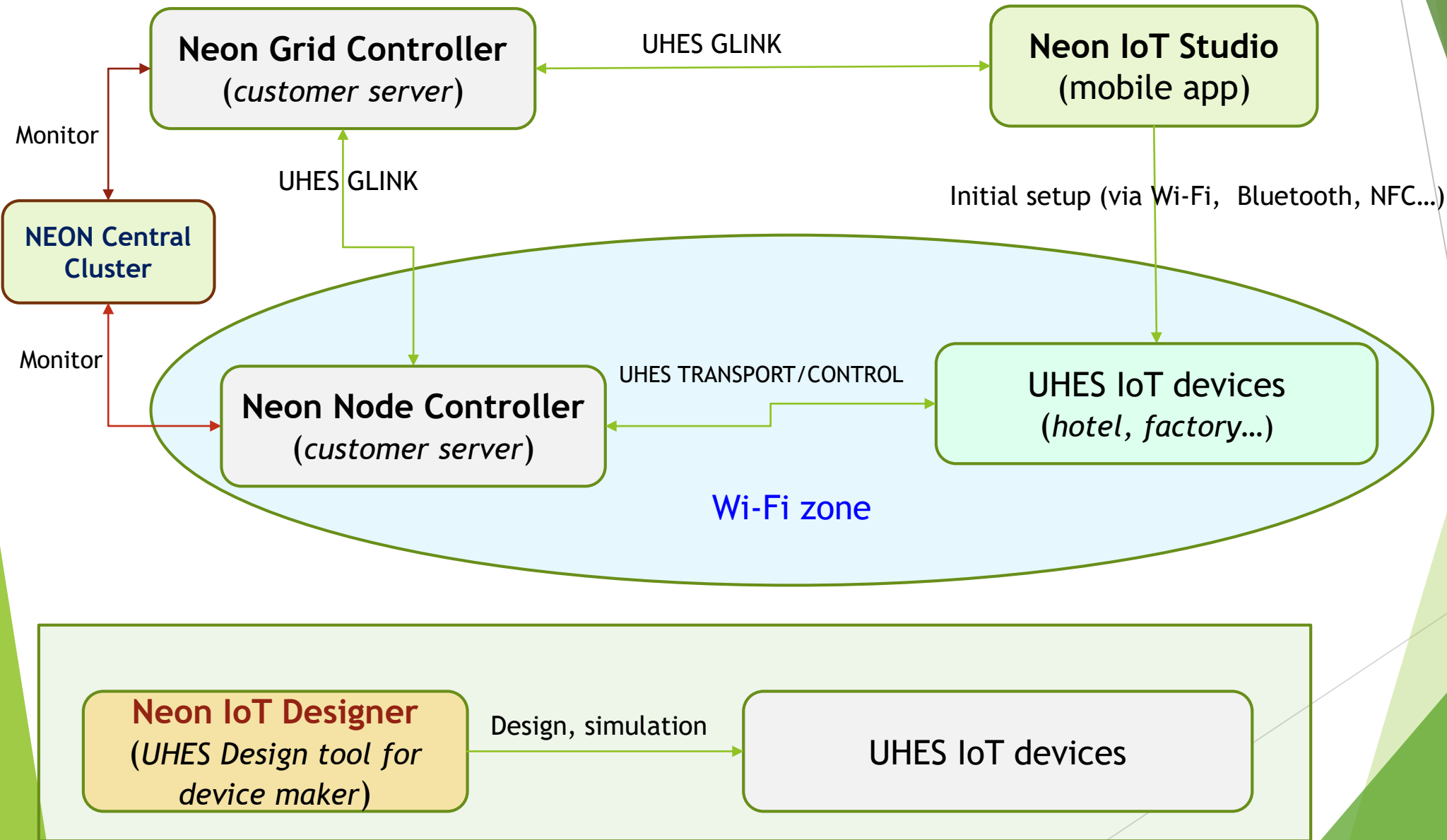
System component diagram (lightweight)



Deployment Strategies (enterprise)



System component diagram (enterprise)



Summary

- Below are benefits that you get from the Neon IoT platform and UHES protocol:
- 1. **NEON IoT Platform** connects all devices that implement UHES protocol. Device maker needs not to care of building and maintenance the server application, mobile application...
- 2. **NEON IoT Platform** in combination with UHES protocol minimizes time and effort of development the firmware of device by reusing most of standardized software components.
- 3. **NEON IoT Platform** is a “*One app for all IoT devices*”. User needs not to install many applications on their mobile phone, PC. *However it also doesn't block device makers to build their own proprietary server application to avoid depending on the Neon IoT Platform. In this case, device firmware should be designed to support both UHES protocol and other protocols up to device makers.*
- 4. **Neon IoT Platform** allows user to customize behavior of their devices via a easy and simple **Graphic programming language**.
- 5. **Neon IoT Platform** is able to analysis huge data collected from devices and provide meaning output data to user by applying machine learning algorithms. Useful for farm, factory...

Copyright notices

The UHES protocol, UHES TRANSPORT protocol, the UHES CONTROL protocol, the UHES GLINK protocol, the NEON IoT platform, the NEON Node Controller, the NEON Grid Controller and all their details are all pending patents and INTELLECTUAL PROPERTY of **The LE company Ltd.**
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