

Architecting Internet of Things

How to populate the Internet neighborhood.

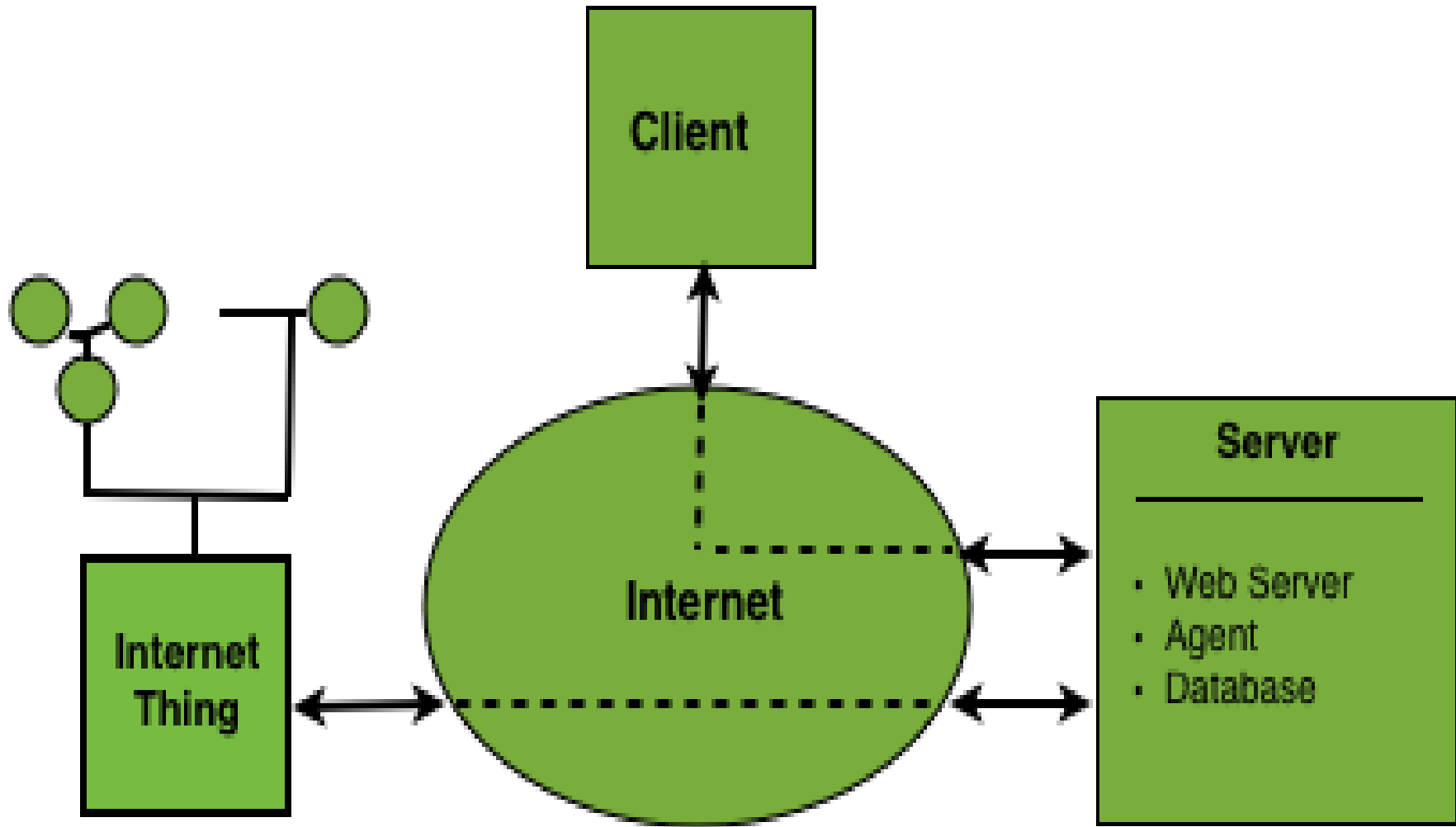
Topic Outline

- Overview
- Internet Things
- Server Side Components
- Server Side Models
- Examples

Logical Components

- Internet of Things Device
- Network
 - Local Area
 - Wide Area / Internet
- Server
 - Web
 - Database
- Client / End user

Overview Block Diagram



Internet of Things Device

- Referred to as “device”
- Can be anything with a network interface
 - Instrumentation
 - Robotics
 - Micro-controller / Arduino device
 - Stove / Refrigerator / Thermostat

Agent

- Agent acts as interface between device and
 - Databases
 - Other servers / forwarding
 - Web / Internet services
- Can be implemented in scripting language such as Python
- Isolates device from end users

Database

- Interfaces to Agent
- Stores data from Internet Thing
- Provides data to web apps
- Many implementations
 - MySQL
 - Rrdtool
 - SQL Server

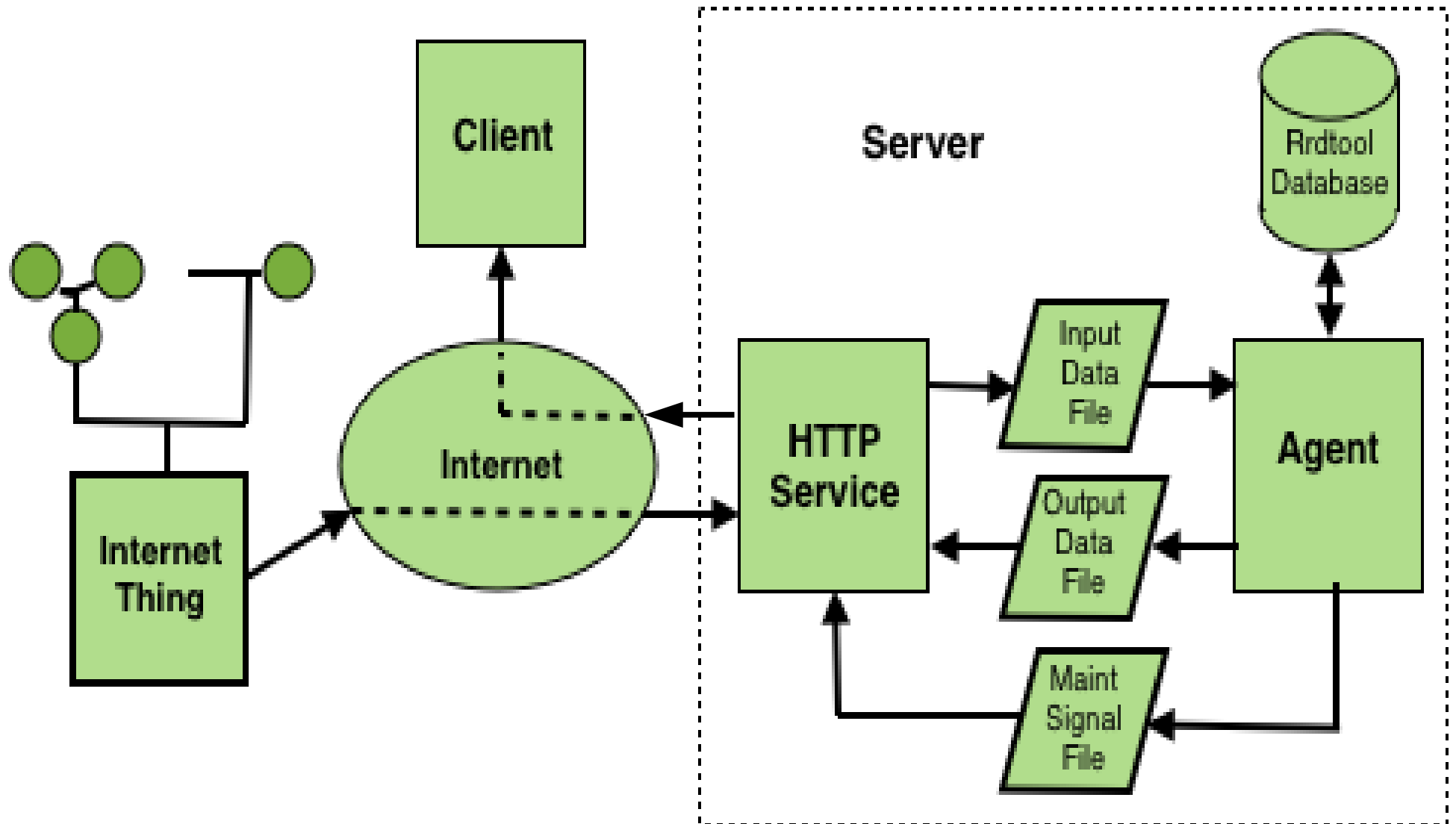
HTTP Server

- Web Server
 - Apache
 - IIS
- Interface to end user clients
- Load is on server – not the device
- Server side scripting
 - PHP
 - ASP

Models

- “Pusher” - Device acts as client
 - Can use wifi interface deep sleep modes
 - Dependent on paired servers
 - Good for one-way telemetry apps
- “Provider” - Device acts as server
 - Can work with any server
 - Allows user interactivity
 - Supports remote robotic apps

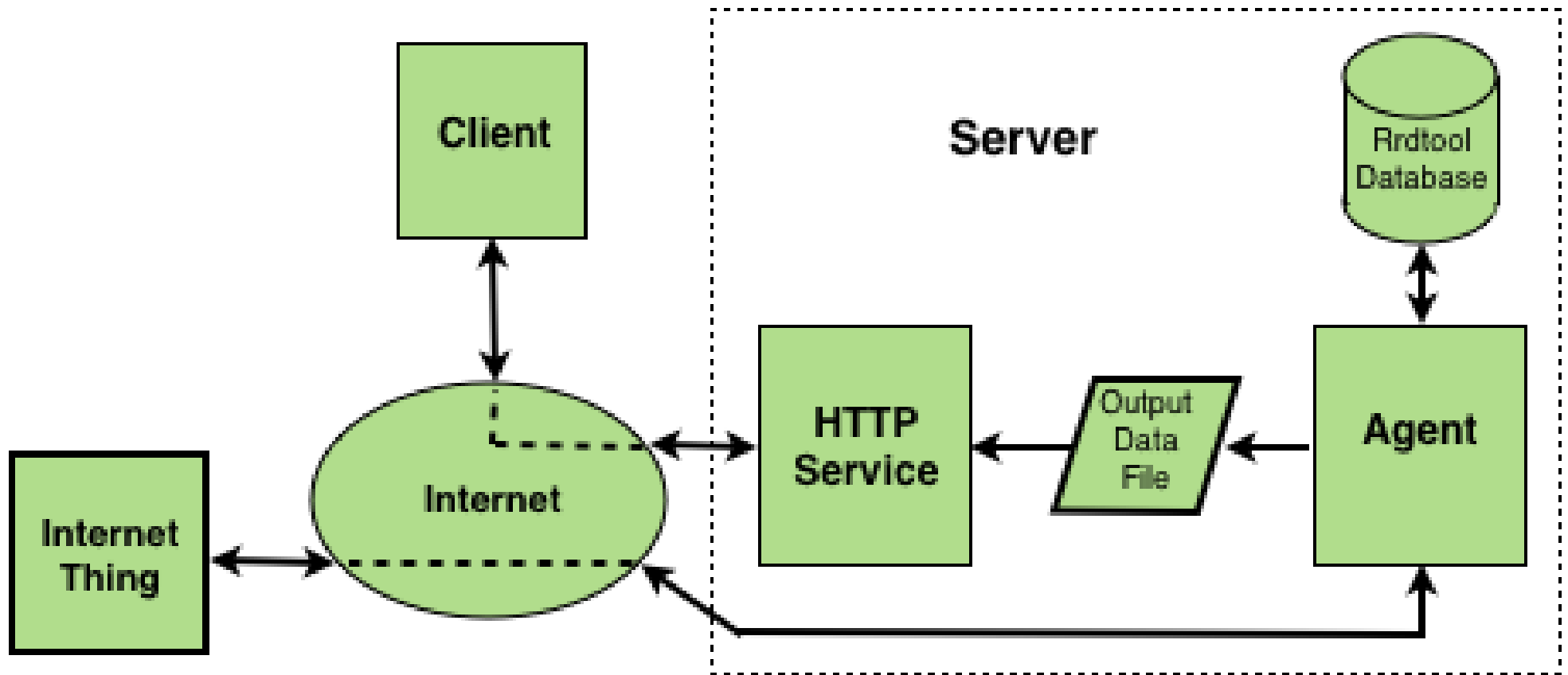
Data Pusher Model



Pusher - Example

- Device sends HTTP Request to server
 - Data sent via Get or Post method
 - URL references PHP script
- Agent
 - Periodically reads input data file
 - Converts / formats data
 - Stores data in database
 - Writes data to output file
- Web services
 - PHP script writes device data to input data file
 - Serve HTML documents to clients / end user
- HTML documents
 - Manages presentation of data to end user
 - Imports data from output data file

Data Provider Model



Provider - Example

- Server sends HTTP Request to Device
 - Get or Post method
 - Specific instructions to device
- Agent
 - Periodically sends HTTP request to device
 - Converts / formats data
 - Stores data in database
 - Writes data to output data file
- Web services
 - Serve HTML documents to clients / end users
- HTML documents
 - Manage presentation to client / end user
 - Import data from output data file

Project Examples - Github

- Radiation Monitoring Device
 - github.com/fractalxaos/radmon
- Weather Station
 - github.com/fractalxaos/weather
- This Slide Deck
 - github.com/fractalxaos/barcamp/ArchitectingIoT