# Price-based Demand Flexibility with OpenADR 3

**Inexpensive, Simple, and Ready**

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## What This Demonstrates

A grid price server uses **OpenADR 3** to communicate hourly dynamic prices to a customer's gateway device that then controls example loads. Both the gateway and load controllers are implemented using low-cost single-board computers and open-source OpenADR 3 code libraries.

This system illustrates that flexible demand appliance standards mandating network connectivity and open/standard protocols are **easily implemented at low/no cost** by appliance manufacturers today.

## Hardware

- **Gateway:** Raspberry Pi 4 (~$35) — reasonable for production
- **Load controllers:** Raspberry Pi 4 for demo; a microcontroller would easily suffice (ESP32 with Wi-Fi, ~$5 in quantity)

## Gateway Software

The gateway includes **Home Assistant** augmented with software to connect and receive prices from a cloud-based price server, distributing prices over the LAN using OpenADR 3.

Home Assistant is free and open-source, used in ~2 million homes worldwide with 3,000+ integrations (Matter, Z-Wave, Zigbee, SmartThings, and more).

## Automatic Configuration

The gateway advertises itself on the LAN; appliances discover and connect automatically via **multicast DNS (mDNS)** — the same technology used to locate printers.

## Why a Gateway?

Only one device needs to know the retailer and tariff. It can also: