

Fing

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DevRecog API

DevRecog API – Fing Device Recognition Cloud API

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1. Introduction

Fing has developed over the last few years a number of AI-driven algorithms to recognise connected devices by brand, make model and OS based on analysing network protocols. A dedicated data team of analysts and data scientists continuously crosscheck and validate recognition levels of our two main engines: the network fingerprinting engine, which is recognizing a device according to its network protocol fingerprint; the machine learning based engine, which creates a prediction model by performing correlation and supervised segmentation of basic device information (including MAC address), using entropy and information gain metrics to hierarchically and sequentially segment the crowdsourced device recognitions.

This document provides some high level overview and guidelines about how to access the Fing DevRecog API suite. It has been designed to be used in any custom context as it requires just an Internet connection and a Fing License Key.

The Fing DevRecogAPI is a JSON HTTP API, which is now the standard for any organization exposing parts of their system publicly to external developers.

It enables third parties to design and implement their own recognition architecture by leveraging the Fing identification engine using standard HTTP requests.

For testing and development purposes, please use our web API documentation: <https://apidocs.fing.io> and request the key to the code to our Fing Sales Team: sales@fing.com.

2. Fing Device Identifier

This section provides an overview on the Fing Identifier, which represents the key features of API.

A Fing Identifier is a tuple containing the **type**, the **brand**, the **model** and the **operating system** of a connected (wired and wireless) devices, along with a **rank** indicating the degree of confidence of the recognition.

While the Brand and Model are specific to each different manufacturer and product, and the list of Operating Systems can be easily identified, the Categorization is very unique to Fing and it is based on the discovery and identification of connected devices over the last ten years.





Fing Types

Fing data model comprehends 7 groups and 98 types:

Mobile

Generic, Mobile, Tablet, MP3 Player, eBook Reader, Smart Watch, Wearable, Car.

Audio & Video

Media Player, Television, Game Console, Streaming Dongle, Speaker/Amp, AV Receiver, Cable Box, Disc Player, Satellite, Audio Player, Remote Control, Radio, Photo Camera, Photo Display, Mic, Projector.

General IT

Computer, Laptop, Desktop, Printer, Fax, IP Phone, Scanner, Point of Sale, Clock, Barcode Scanner.

Home Automation

IP Camera, Smart Device, Smart Plug, Light, Voice Control, Thermostat, Power System, Solar Panel, Smart Meter, HVAC, Smart Appliance, Smart Washer, Smart Fridge, Smart Cleaner, Sleep Tech, Garage Door, Sprinkler, Electric, Doorbell, Smart Lock, Touch Panel, Controller, Scale, Toy, Robot, Weather Station, Health Monitor, Baby Monitor, Pet Monitor, Alarm, Motion Detector, Smoke Detector, Water Sensor, Sensor, Fingbox, Domotz Box.

Networking

Router, Wi-Fi, Wi-Fi Extender, NAS, Modem, Switch, Gateway, Firewall, VPN, PoE Switch, USB, Small Cell, Cloud, UPS, Network Appliance.

Server

Virtual Machine, Server, Terminal, Mail Server, File Server, Proxy Server, Web Server, Domain Server, Communication, Database.

Engineering/IoT

Raspberry, Arduino, Processing, Circuit Board, RFID Tag.

Fing Ranking

Recognition ranking is a measure from 0 to 100 of the quality of the recognition. It is used to compare identifiers of the same device over time.

There are some peculiarities related to the Fing ranking that differs significantly from a standard linear evaluation system. The Fing ranking has the following properties:





- The scale is not linear.
- **Any value greater than 0 is acceptable.**
- In case no recognition is available, no result is provided.
- **You can use comparison criteria such as “if $r1 > r2$ ”, meaning $r1$ is the best solution.**
- Some guidelines to understand the ranking:
 - 90+
Highly accurate information, gathered directly from the devices or from processing precise information with machine learning.
 - 40+
Very reliable protocol information (e.g. from SNMP, UPnP, Bonjour, HTTP User Agent fingerprints).
 - 20+
DHCPv4/v6 information is based on best effort in most cases; however, in some other cases it is as strong as the protocols mentioned above.
 - 1-20:
NetBIOS, empiric rules (e.g. rules based on hostnames and MAC vendor).
- Whilst processing the fingerprints and generating prediction models for recognition, our machine learning algorithms interpolate the above reference scores by weighting confidence levels.

It is advisable to always keep Fing results and not discard even low values given the drop is performed by the Fing engine itself in order to avoid sending a misrecognition.

The more protocols are provided, the more accurate recognition levels are achieved.

3. Network Data

For each protocol, the processed information here listed:

ARP

- MAC Address

HTTP

- List of User-Agents



DHCP v4

- Params,
- Vendor,
- Hostname

DHCP v6

- Hostname,
- Message Type,
- Options Request,
- Vendor,
- Options,
- Enterprise

NetBIOS

- Device name,
- Device hostname

UPnP

- Device name
- List of device types,
- List of uPnP services

Bonjour

- Device name,
- List of bonjour services.

SNMP

- Device name,
- Description,
- Location,
- Contact point,
- System OIDs



4. Licensing

Any request must point to the specified base path and must be authenticated through an API Key provided through the following HTTP header.

HTTP Header	HTTP Value (Ex.)
X-API-KEY	7c6adf5203411fd4cbf49d08f8cd84c0655def270f8d3/==

Fing Sales Team provides a valid key for free trial of the duration of 4 weeks (“Development License”) through standard channel such as email. After the trial period, in case the counterpart enters into a Licence Agreement, a new key is provided (“Production License”) via PGP-encrypted email.

5. API Documentation

This section provides a qualified list of the APIs. For further information, refer to the official documentation:

[/devrecoglicense](#)

DESCRIPTION	Recover your license information. Specifically: • Identifier • Status (ACTIVE or EXPIRED) • Thresholds
URL STRUCTURE	https://service.fing.io/2/devrecog
METHOD	GET
FULL DOCUMENTATION	/devrecoglicense
RESPONSE	<pre>{ "state": "state", "licenseid": "licenseid", "creditsavail": 0.8008281904610115, "limithitcredits": true, "limithitcalls": true }</pre>
AUTHENTICATION	License Key provide as HTTP Header (X-API-Key)
QUICK TEST	<code>curl -X GET \</code>



```
https://service.fing.io/2/devrecoglicense \
-H 'Content-Type: application/json' \
-H 'X-Api-Key: '${API_KEY}
```

/devrecog

DESCRIPTION	Recognize a list of devices and network. Fing identifier contains fully or partially qualified information on devices and network. • Device ○ MAC Address ○ Type ID ○ Type Name ○ Type Group ○ Brand ○ Model ○ Operating System (Name and Version) • Network ○ Hostname ○ GeoLocation (City, Region, Country, Continent) ○ ISP and Organization
URL STRUCTURE	https://service.fing.io/2/devrecog
METHOD	POST
FULL DOCUMENTATION	/devrecog
RESPONSE	<pre>{ "devices": [{ "recognition": { "type-group-name": "Network", "mac-vendor": "LG Electronics", "rank": 75, "model": "Galaxy S6", "os-name": "Android", "type": "ROUTER", "brand": "Apple", "os-ver": "5.0.0", "type-name": "Router" }, "mac": "001122334455" }], "networks": [{</pre>



	<pre> "recognition": { "InternetInfo": { "hostname": "acces.134.136.23.62.rev.coltdfrance.com", "regioncode": "RM", "city": "Rome", "timezone": "America/Los_Angeles", "countrycode": "IT", "isp": "Verizon", "organization": "Verizon", "continentcode": "EU" } } </pre>
AUTHENTICATION	License Key provide as HTTP Header (X-API-Key)
MANDATORY INFORMATION	For each networks: • Network ID • Network Address (CIDR Notation) • Public IP • Gateway IP • Gateway MAC Address • DNS IP For each devices: • Network ID of the network the devices belongs to • IP Address • MAC Address • State (UP or DOWN)
QUICK TEST	<pre> curl -X POST \ https://service.fing.io/2/devrecog \ -H 'Content-Type: application/json' \ -H 'X-API-Key: '\${API_KEY}' \ -d '{ "networks" : [{ "nuid" : "nw_test", "internetip" : "67.109.163.226", "gatewaymac" : "00:11:22:33:44:55", "bssids" : "11:22:33:11:22:33", "dnsip" : "192.168.0.1", "nettype" : "ETHERNET", "netaddress" : "192.168.0.1/24", "gatewayip" : "192.168.0.1" }], "devices" : [{ "nuid": "nw_test", "mac" : "F0:98:9D:77:4C:13", "ip": "192.168.0.2", "state": "UP"}]}' </pre>

/devicetypes



DESCRIPTION	Get the full list of Fing Types See section 5 for further information.
URL STRUCTURE	https://service.fing.io/2/devicetypes
METHOD	GET
FULL DOCUMENTATION	/devicetypes
RESPONSE	<pre>{ "devicetypes": [{ "id": "LAPTOP", "name": "Laptop", "group": "Home & Office" }, ...] }</pre>
AUTHENTICATION	License Key provide as HTTP Header (X-API-Key)
QUICK TEST	<pre>curl -X GET \ https://service.fing.io/2/devicetypes \ -H 'Content-Type: application/json' \ -H 'X-API-Key: '\${API_KEY}</pre>

6. Testing

Using shell command (e.g. cURL)

<https://curl.haxx.se/docs/>

Using a graphical HTTP Client (e.g. Postman)

<https://www.getpostman.com/>

Using the official API Client and Documentation (SwaggerHub)

<https://apidocs.fing.io>



