

# EACOF

Energy Aware COmputing Framework

[github.com/eacof](https://github.com/eacof)

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# Overview

- What's the Problem?
- How EACOF works
- How to use EACOF / Demo
- EACOF Internals
- Use Cases

Software uses energy

Software drains your battery

“I absolutely love apps that respect the fact I want to go as long as possible without charging my phone”

~ kintamanimatt, Hacker News

BUT

Badly instrumented

So. Many. APIs.

Heuristics are HARD

It's early days yet

# EACOF

- Monitor desktop energy consumption
- Written in C
- Tested on OS X and Ubuntu
- Designed to solve headaches
- BSD 2-clause license
- <http://github.com/eacof>

# How EACOF works

# High level



# Providers



# Consumers

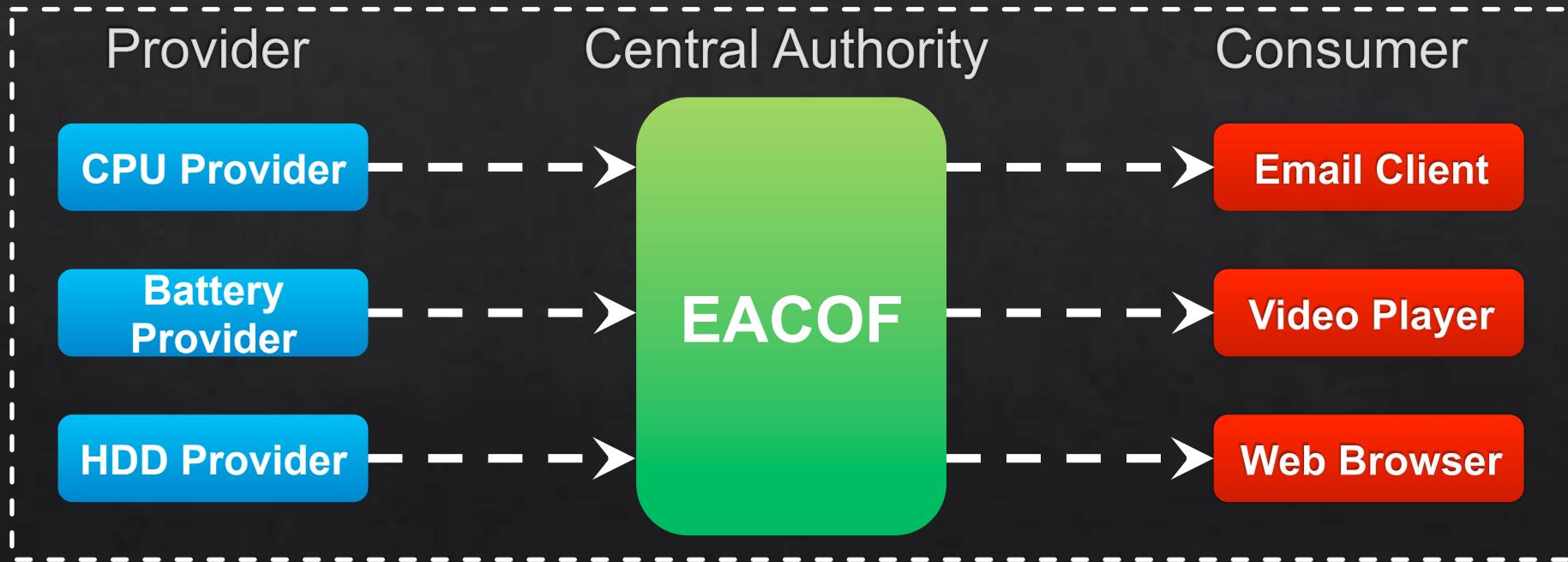
Provider

Central Authority

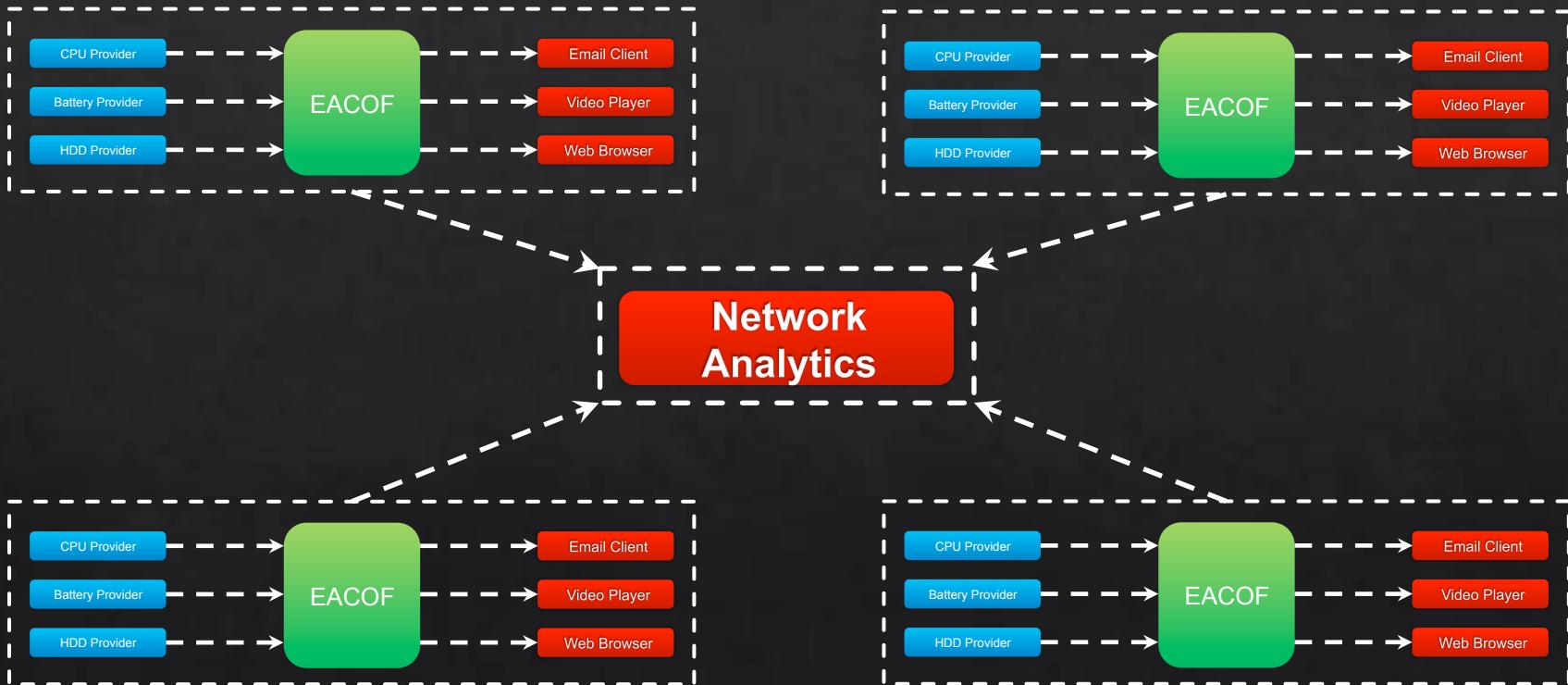
Consumer



# One machine



# Networked



# How to Use EACOF

# Simple Provider Example

```
while(1) {  
    collectEnergyData();  
    waitABit();  
}
```

# Simple Provider Example + EACOF

```
#include <eacof.h>

initEACOF();
createProbe(devices, monitored);
while(1) {
    collectEnergyData();
    addSample(probe, sample);
    waitABit();
}
deleteProbe(probe);
```

# Simple Consumer Application

```
for (int i = 0; i < 10000; i++) {  
    printf("Hello EACOF!");  
}
```

# Simple Consumer Application + EACOF

```
#include <eacof.h>

initEACOF();
setCheckpoint(devices, monitored);

for (int i = 0; i < 10000; i++) {
    printf("Hello EACOF!\n");
    sampleCheckpoint(checkpoint);
}

deleteCheckpoint(checkpoint);
```

# API

```
#include <eacof.h>

initEACOF();
createProbe(); deleteProbe();
activateProbe(); deactivateProbe();
addSample();
setCheckpoint(); deleteCheckpoint();
sampleCheckpoint();
```

# Trivial Sorting Energy Test Results

Sorted 80,000 random values:

Sorting Algorithm	Energy (J)
Quicksort	5
Mergesort	8
Insertion Sort	100
Bubble Sort	600

# Sorting Application Example + EACOF

```
#include <eacof.h>

initEACOF();
createCheckpoint();
while( Current Sort Count < Number Of Sorts) {
    Sort();
    sampleCheckpoint();
}
deleteCheckpoint();
```

# Internals

# Externally Modular

# Simple API

*initEACOFO()*

*addSample()*

*sampleCheckpoint()*

*deleteCheckpoint()*

*createProbe()*

*setCheckpoint()*

*deleteProbe()*

Internally Modular

# Internal Hierarchy

Public API

Network API

Network Handler

Network

Storage

# EACOF

C

*Energy measurement*

*Simple API*

*BSD 2-clause*

*Powerful*

*Improves over time*

*Linux OS X*

*Modular*

# Use Cases

# Web Browsers



# Whole system consumption



# CPU consumption



# Making feature decisions

EACOF can do all this!

# Other uses

# Adaptive applications

# Non-energy tasks

# EACOF

c

Linux OS X

Modular

Improves over time

Powerful

BSD 2-clause

Simple API

*Energy measurement*

# Thanks

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JPedz