

# Mobile Efficiency for Plug Load Devices

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# AGGIOS

- **AGG**regated **IO** Systems
- **Team:** ex ARM and Qualcomm people
- **Experience:** Mobile devices
- **Research base:** Leading experts from UC Berkeley and Princeton University
- **Business:** Independent provider of energy management and design technology for mobile, plugged, wearables and IoT

# Nature

**HOW WE DESIGN  
SYSTEMS ...**



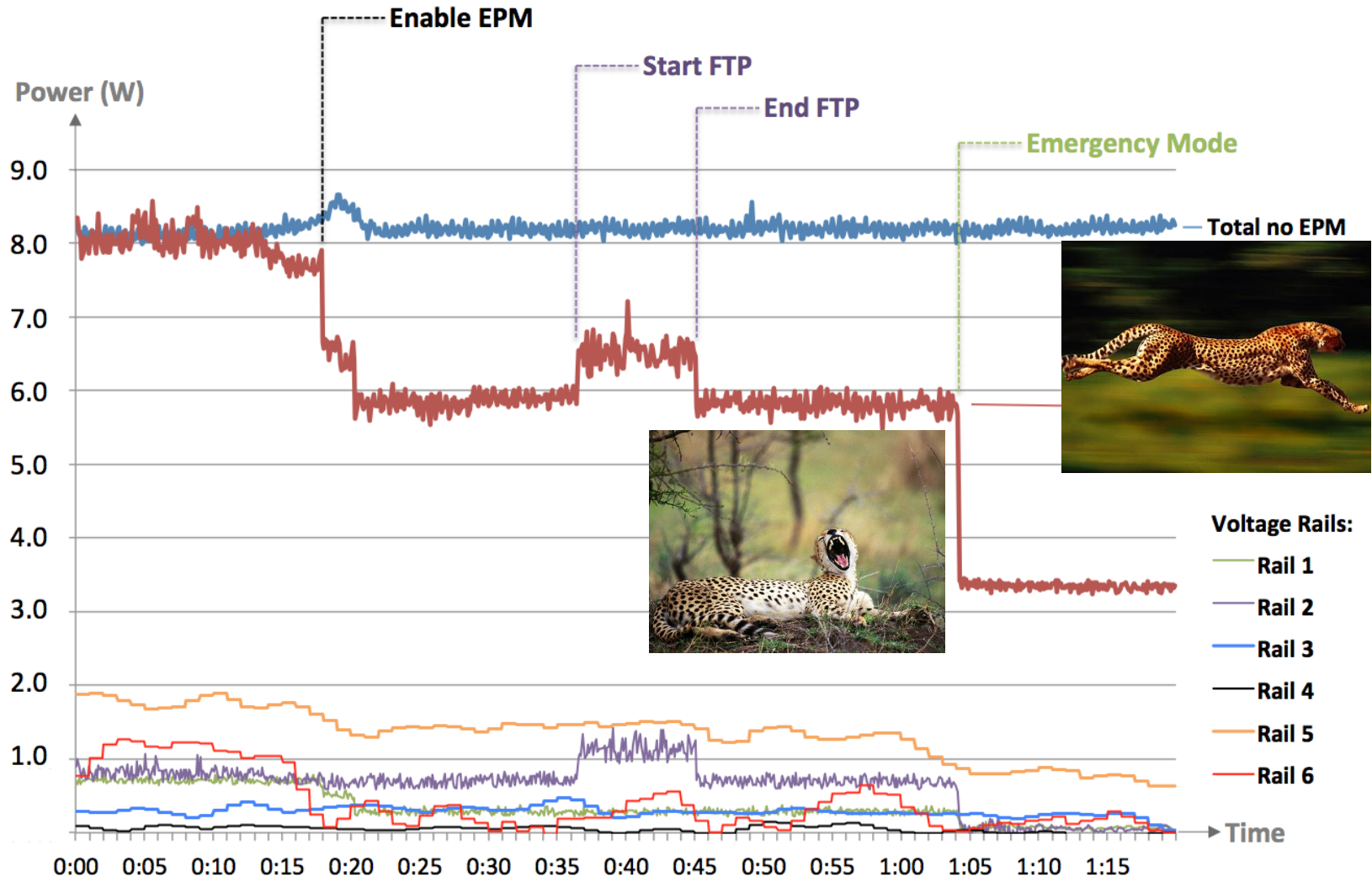
**... FOR MAXIMUM  
PERFORMANCE**

**HOW NATURE DESIGNS  
SYSTEMS ...**



**... FOR MAXIMUM  
EFFICIENCY**

# Energy proportional management



# Demo Video

- Mobile Device versus IP Set-Top-Box

# AGGIOS technology

Unified Hardware  
Abstraction (UHA™)

EnergyLab™  
Tools

CLIOS™

The screenshot shows the Aggios Energy Lab software interface. The title bar reads "Aggios Energy Lab: /home/dmista/work/uhaltools/examples/c2k/c2k.uhal". The menu bar includes "File", "Edit", "Actions", "View", and "Help". Below the menu bar are icons for "Open", "Generate", "Search", "Filter", "Clocks", "Components", and "Controllers".

The main window is divided into two panes. The left pane shows a tree view of the system hierarchy:

- SYSTEM
  - NAME SPACE
  - ADDRESS SPACE
  - INTERRUPT SPACE
  - VOLTAGE SPACE
  - CLOCK SPACE
  - RESET SPACE
- SCENES
  - IMPACT DEFINITIONS
  - TASK DEFINITIONS
  - SCENE DEFINITIONS
  - TRANSITION TABLE
- TEST/MEASURE
- SIMULATE

The right pane shows a table of components:

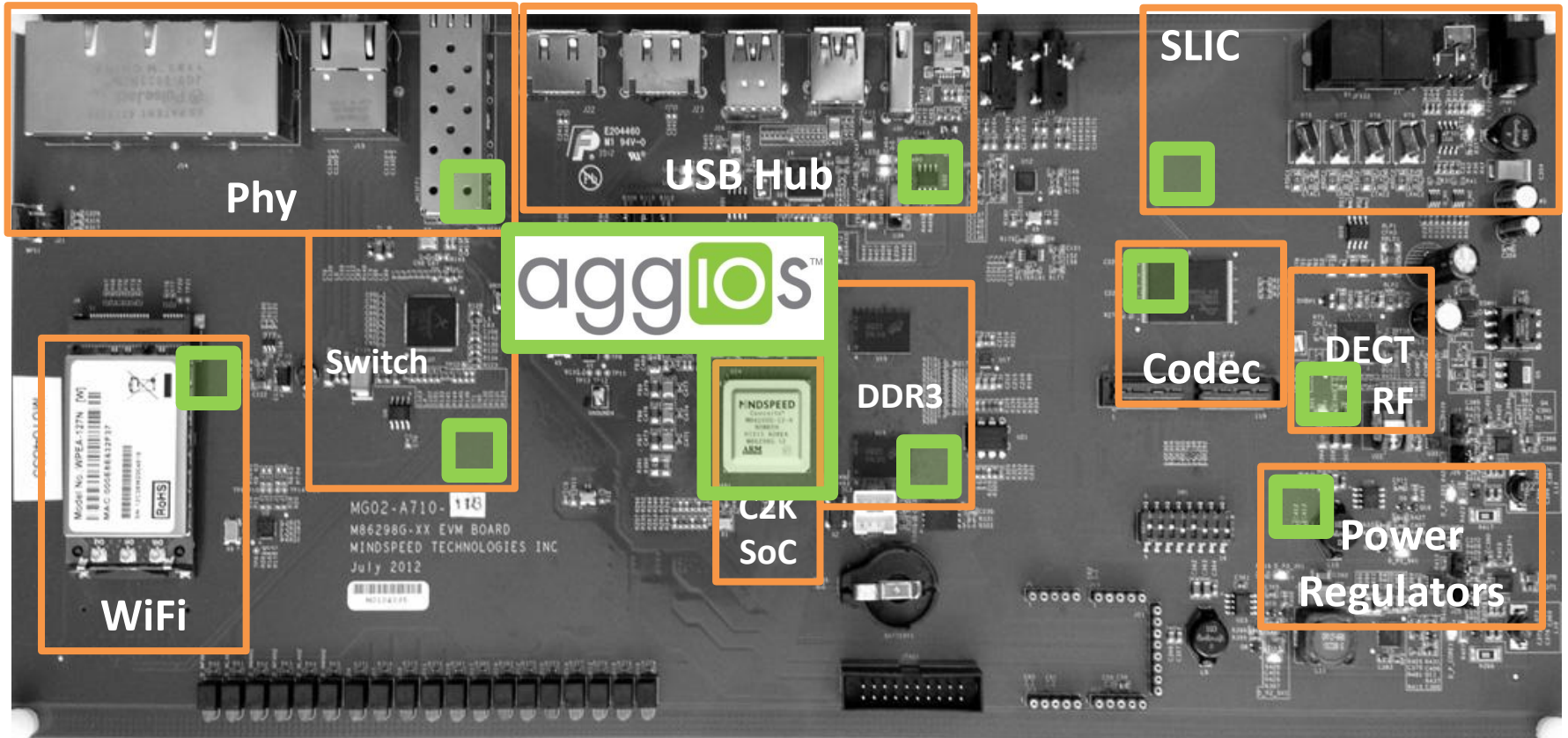
Component	Inherits From	Type	Filename
abstract nodes	-	component	<c2k.uhal>
mpu	-	component	<c2k.uhal>
axi	-	component	<c2k.uhal>
scu	-	component	<c2k.uhal>
apb	-	component	<c2k.uhal>
pfe	-	component	<c2k.uhal>
tdm	-	component	<c2k.uhal>
active	-	operating-state	<c2k.uhal>
inactive	-	operating-state	<c2k.uhal>
usbphy_serdes_stat	-	component	<c2k.uhal>
tdma	-	component	<c2k.uhal>
timer	-	component	<c2k.uhal>
pci	-	component	<c2k.uhal>

Below the table is a properties table:

Name	Value
Line number(s)	231 - 234
Node Type	operating-point
power	0 mW
action	&tdmntg_rst_put_in_reset(), &tdmNTG.disable(), &tdm.disable()

At the bottom of the interface, there are tabs for "Properties", "Source", "Output", and "Errors". The "Properties" tab is active, showing "Position: (0,0)".

# MINDSPEED C2000 Residential Gateway



 - power/energy controlled by CLIOS



# Conclusions

- Mobile and plug load devices converge on:
  - Architectures and protocols
  - Performance requirements
  - Energy and latency requirements
- Diverge on:
  - Energy management innovation
  - Workforce expertise
  - Bill of material and design costs
  - Competitive environment



# Proposed Next Steps

- Align with the mobile best design practices for energy proportionality of plug loads
- Adopt mobile design standards to plug loads and actively contribute to standard and best practices evolution
- Based on mobile practices develop
  - Reference design methodology for plug loads
  - Device prototypes and reference designs

aggios™

*... think energy.*