SCTE ISBE **CABLE-TEC**
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Perspectives on IoT
Analyzing Growth, Opportunities and Defining Selection Criteria

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Essential Knowledge for Cable Professionals™

The Law of Accelerating Returns*

Analyzing the evolution of the Internet of Things

Courtesy: The Singularity is Near by Ray Kurzweil

Rationalizing predictions about the pace of change of IoT

- How fast is the evolution of IoT going to be?
- A useful model is Ray Kurzweil's Law of Accelerating Returns*
  - Technological Evolution is Exponential **not** Linear
  - The Compound Interest Effect
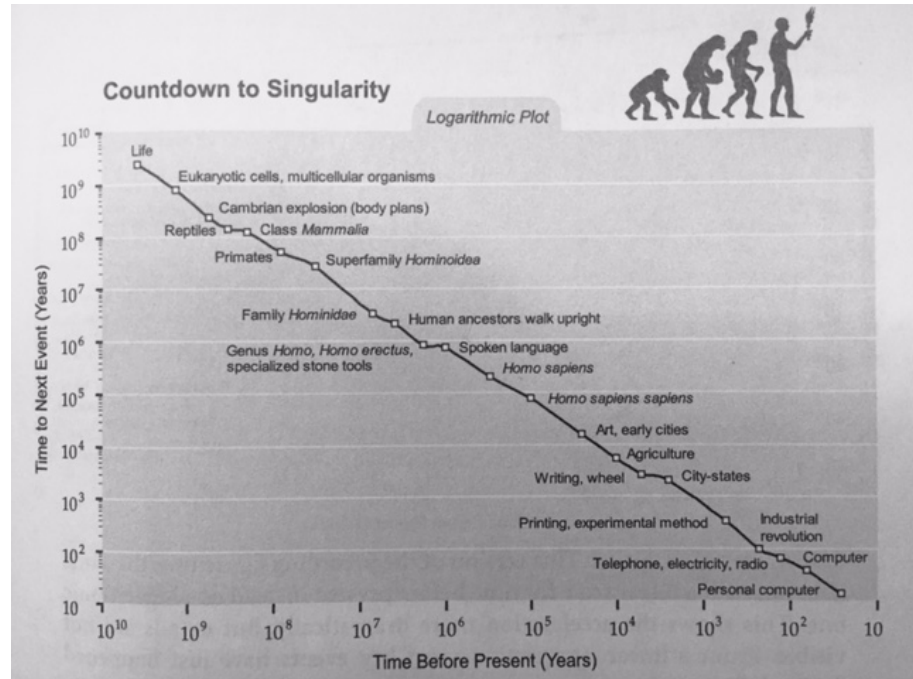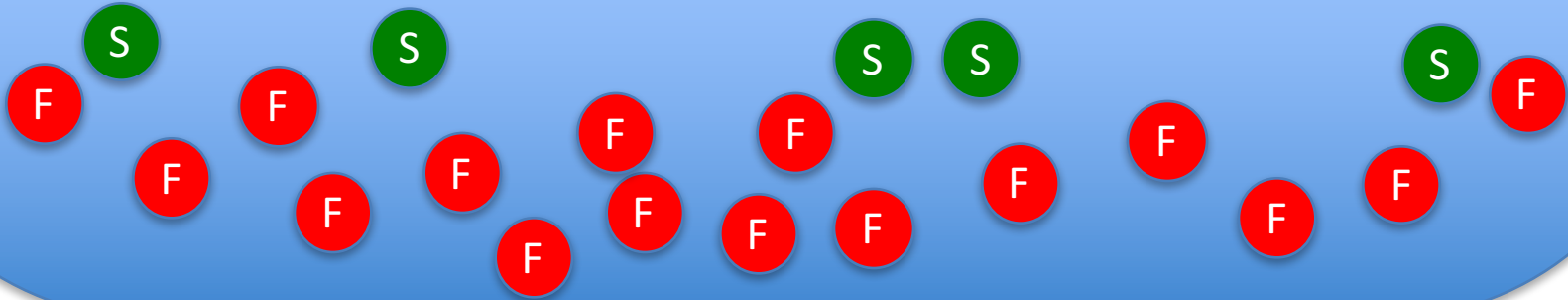

*Courtesy: The Singularity is Near by Ray Kurzweil

Natural Selection within the Internet of Things

- Given the subtle though accelerating pace of the Internet of Things there are bound to be some winners and losers
- How does one look the opportunities and separate the **Successes** (S) from the **Failures**(F)?

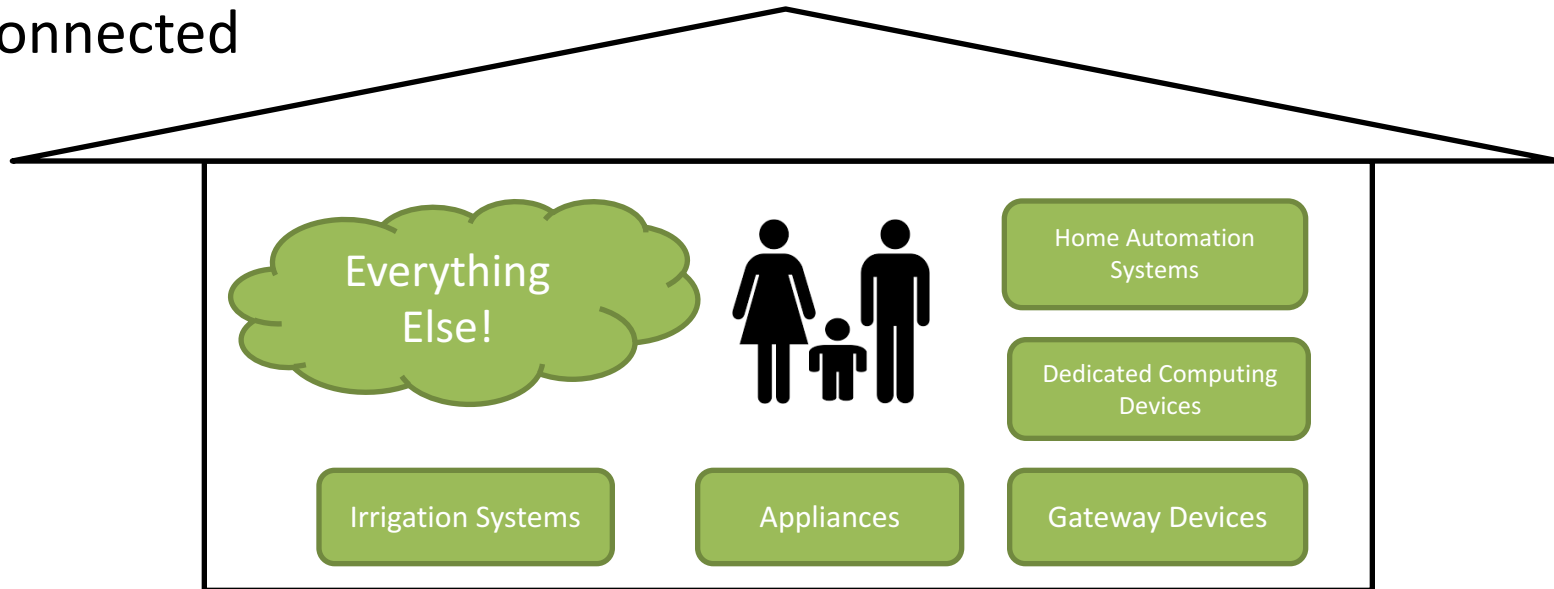Endless Pool of Ideas and Opportunities within IoT

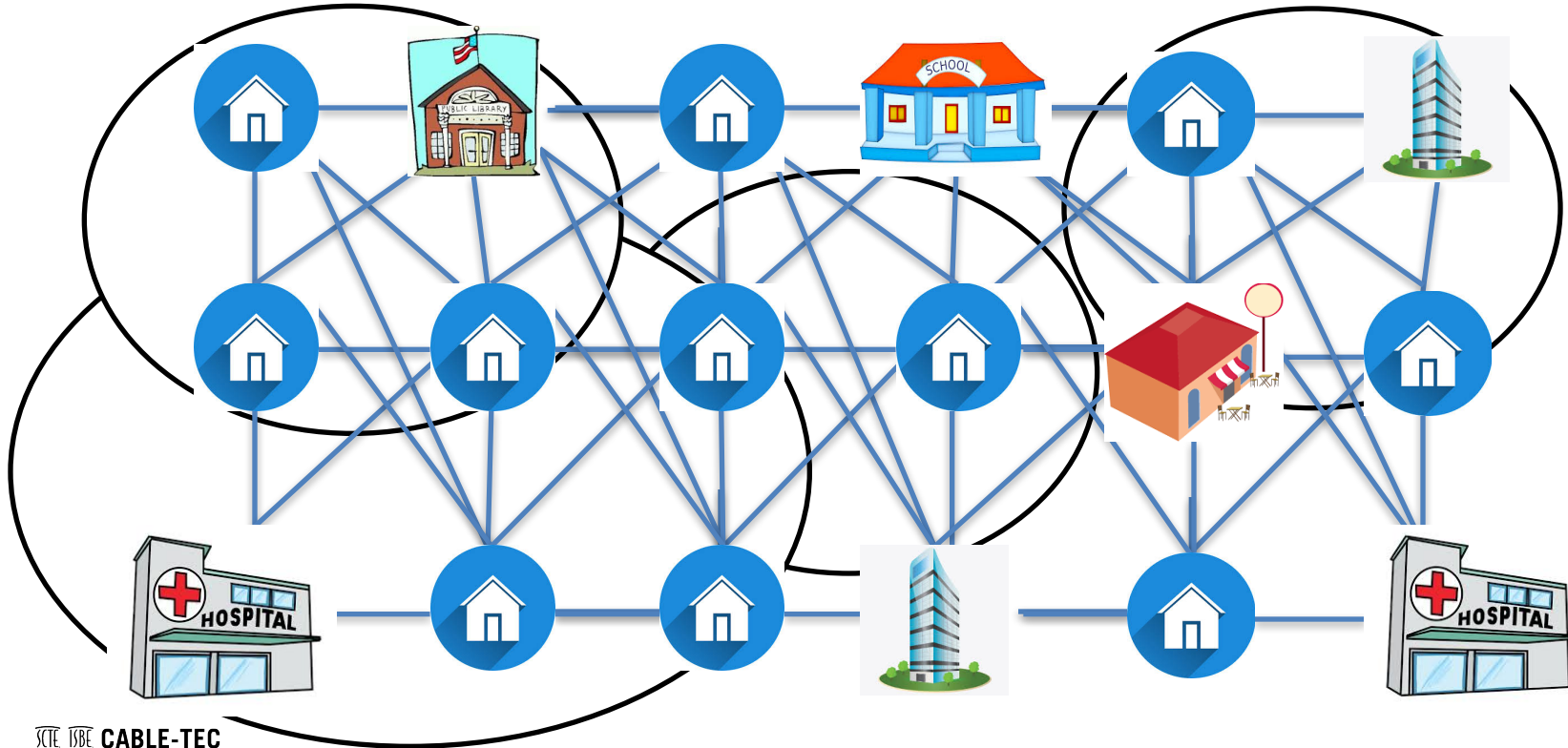# Visualizing the Possibilities

A world of endless opportunities

Visualizing the Home through an IoT filter

- The goal of IoT is **Ubiquitous Connectivity**

1. Start with getting everyone and everything in the home connected

2. Extend this beyond the home and we notice overlapping clusters based on different types of interactions emerge

And Numerous Possibilities Emerge!

There are the usual suspects

- Appliances
- Health and Fitness devices
- Security Systems
- Etc

And then there are the unusual suspects

- Clothes
- Books
- Medical devices
- Medications

- Food
- Household documents
- Kitchen Tools
- Etc.

Organizing the Possibility Space

Generic Themes

- Awareness of people and things
  - Uberization of people and things
  - Redundancy management
  - Just in Time management
  - Search
  - Automated recommendations
  - Accelerated natural selection of product
- Value Chain Integration
- Predictive Modeling

Specific Application Verticals

- Energy Optimization
- Entertainment
- Communication
- Security
- Home Healthcare
- Productivity
  - Efficiency
  - Automation
- Social/Community Networking
  - Start with smaller groups such as a family and move to larger groupings
- Independent Living

Challenges

- **Identification and Authentication**
- **Onboarding**
- **Organization**
- **Ethics**
- **Security**
- **Privacy**
- **Device Association**
- **Robust Connectivity**
- **Simplicity**
- **Data Management**
- **Rules Discovery and Management**

And probably the most important being…

Solution Discovery

i.e. How does one determine which opportunities to pursue?

A Framework for Opportunity Selection

From Ideation to Implementation

Strategies for finding candidate opportunities

- Things to look for in an opportunity
  1. Functionality - Ability to address the user's need
     - Financial, Convenience, Security, Productivity…
  2. Fit with MSO strengths and core competencies
  3. Driver for cost reduction, revenue growth or both

Understanding the participants

- **Individuals and Communities**
  - Motivation is Personal
  - Avenues are opensource development initiatives or personal projects.
- **Industry**
  - Analyzing opportunity through the lens of business goals
- **End-users of the Internet of Things**

Broad Monetization Strategies

- **As an <u>IoT System Integrator</u>**
  - MSO devices act as IoT hubs allowing other IoT service/application providers to use our infrastructure to deliver their service offerings.

- **As an <u>IoT Services Provider</u>**
  - Leverage existing subscriber to begin offering IoT services.
  - Some areas
    - Energy efficiency
    - Safety and Security
    - Convenience

The Internet of Things as an extension of our core competencies

IoT Foundational Requirements

Identity	Onboarding	Connectivity	Location	Security	Privacy	Device Profiles	Data Management

MSO capabilities

Content Production	Content Delivery	Broadband Internet	Video – Linear/VOD/OTT	Home Automation	Data Center	Managed Secure Network
Home Security	Privacy	Fault Tolerance	Voice	Presence/Location Services	Customer Support	IoT Device Connectivity Platform

Cable Infrastructure
Devices & Connectivity Services

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Framework for determining opportunities

1. Identify the problem domain and a broad statement of the opportunities

2. Determine the participants, controllers and the pain-points within the **value chain** for the selected problem domain

3. Enumerate the set of candidate opportunities

4. Perform a feasibility analysis to determine viability for each candidate opportunity

5. Determine the ROI and the probability for the candidate opportunity to succeed.

6. Pursue or reject each candidate opportunity based on a set of predefined acceptance criteria.

Energy Management

A Hypothetical Case Study in IoT Opportunity Selection

Identify the problem domain and a broad statement of the opportunity

- Problem Domain
  - Energy Management
- Broad statement of Opportunity
  - Use data on energy consumption within the home to drive value for users.

Determine the players, pain-points and controllers within the value chain

The value chain extends from *energy producers*, to *energy distributors* to *consumers* to *devices that consume electricity* and lastly to *devices that monitor energy use.*

Energy Producers

Energy Distribution

Devices and Monitoring for Energy Use

Energy Aware Device Manufacturers
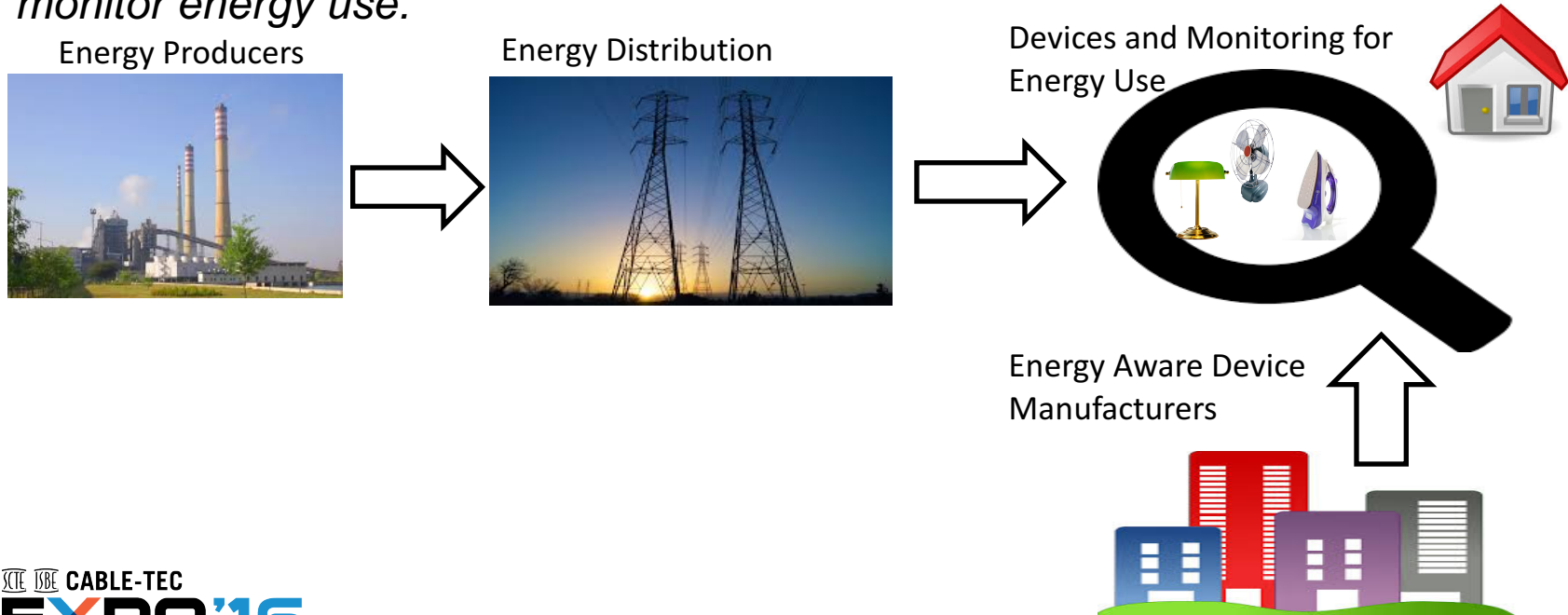
Enumerate the set of possible opportunities

1. Allow users to leverage price fluctuations by redistributing energy consumption to minimize usage during peak hours

2. Optimize energy usage within the home by detecting and stopping wasteful usage

3. Correlate data on home energy usage to other features such as presence detection, intruder alert and theft of energy

4. Provide a platform for utility companies to add other value-added services such as the purchase of stored energy within the home

5. Real-time comparison of various available energy options – thermal, solar etc.

Perform a Feasibility Analysis

- Does there exist a mechanism to obtain in real-time or otherwise price information for various times within the day? Are Utility companies willing to share this information?

- Are there sufficient standards and protocols in this space to allow for ease of implementation and interoperability?

- Is there a sufficient quorum of energy-aware devices or available energy monitoring devices to allow for meaningful monitoring of energy use within he home?

- Will an MSO have sufficient standing relative to players within the value chain so as to drive product differentiation and thereby exercise better control over profits and avoid substitution?

  - If no, is there an acquisition or partnership opportunity that allows for this?

- How competitive is this space and what are the barriers to entry?

- What is the relative value of serving as System Integrator versus being a Services Provider?

Determine the return on investment and the probability of success for each opportunity

List of candidate opportunities	New Revenue or Cost Reduction potential (ROI)	Probability of Success
Allow users to leverage price fluctuations by redistributing energy consumption to minimize usage during peak hours.	✔	✔
Optimize energy usage within the home by detecting and stopping wasteful usage	✔	✔
Correlate data on home energy usage to other features such as presence detection, intruder alert and theft of energy	✔	✔
Provide a platform for utility companies to add other value-added services such as the purchase of stored energy within the home	✔	✔
Real-time comparison of various available energy options – thermal, solar etc.	✔	✔

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Pursue/Reject Opportunity

- Pick one or more opportunities that meet established success criteria and proceed.

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