Welcome!

Unlocking the Power of Edge Computing
April 14, 2019

Workshop Organizers

Tushar Krishna, Georgia Tech,

Kishore Ramachandran, Georgia Tech

Anish Arora, OSU

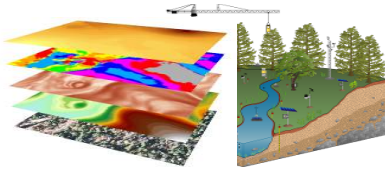# Setting the Context for the Workshop

IoT boom: Sensor-rich environment

A Broad Set of IoT Applications

Energy Saving (I2E)

Defense

Predictive maintenance

Enable New Knowledge

Intelligent Buildings

Industrial Automation

Enhance Safety & Security

Transportation and Connected Vehicles

Healthcare

Agriculture

Smart Grid
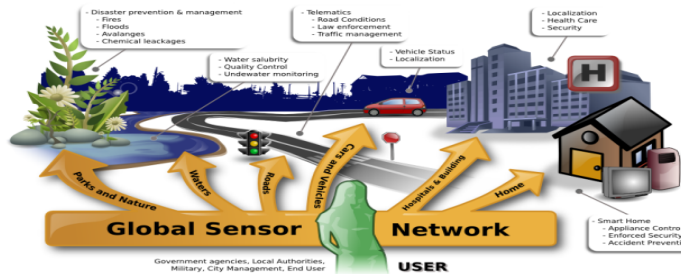
Smart Home

Thanks to CISCO for this slide

Future Internet Applications on IoT

- Sense -> Process -> Actuate

- Common Characteristics
  - Dealing with real-world data streams
  - Real-time interaction among mobile devices
  - Wide-area analytics

- Requirements
  - Dynamic scalability
  - Low-latency communication
 - Efficient in-network processing

Cloud Computing

- Good for web apps at human perception speeds
  - Throughput oriented web apps with human in the loop
- Not good for many latency-sensitive IoT apps at computational perception speeds
  - sense -> process -> actuate
- Other considerations
  - Limited by backhaul bandwidth for transporting plethora of 24x7 sensor streams
  - Not all sensor streams meaningful
    => Quench the streams at the source
  - Privacy and regulatory requirements

Fog/Edge Computing

- Extending the cloud utility computing to the edge
- Provide utility computing using resources that are
  - Hierarchical
  - Geo-distributed
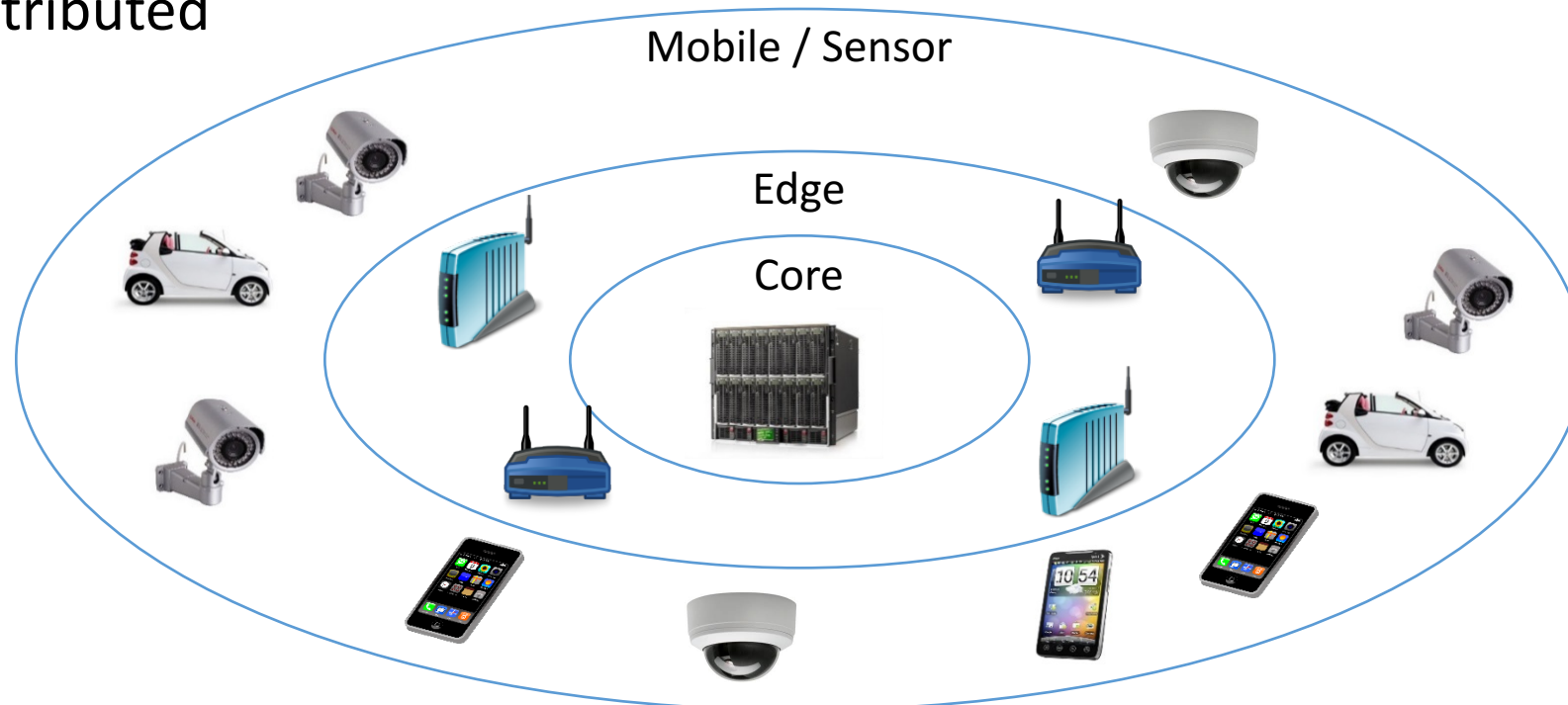
Fog/edge computing today

- Starting to see more in the edge space
  - Analytics at the edge
  - Accelerators at the edge
- HPC and Cloud-Edge systems
  - Ingest data from scientific instruments in real-time
    - Data volume and rates => cannot stage the data
  - Edge to the rescue
- A new symposium on edge computing (now in the 3rd year)
- Industry?
  - Platforms: IoT Azure Edge, CISCO Iox, Intel FRD
  - Lots of action with small startups more than the tech giants in the edge space

UNLOCKING THE POWER OF EDGE COMPUTING

Workshop Format and Agenda

April 14, 2019

ORGANIZERS

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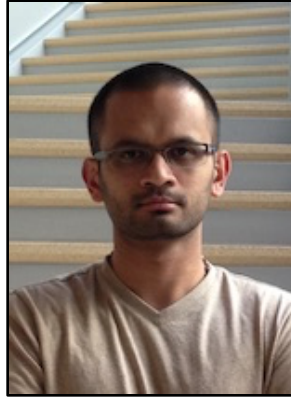
INVITED SPEAKERS

Prashant Shenoy
Professor and Assoc. Dean
Univ of Mass, Amherst

Ganesh Ananthanarayanan
Research Scientist
Microsoft Research

Suman Banerjee
Professor
Univ of Wisconsin, Madison

Kandan Kathirvel
Director
AT&T

Francesc Lordan
Postdoctoral Researcher
Barcelona Supercomputing Center

Daniel Reed
Sr. Vice President of Acad Affairs
University of Utah

AGENDA FOR TODAY

Time	Title	Presenter
9:00 - 9:45	Keynote #1: Towards Special-purpose Edge Computing	Prashant Shenoy (Univ of Massachusetts, Amherst)
9:45 – 10:00	Break	
10:00 – 10:30	Live Video Analytics – the "killer app" for edge computing!	Ganesh Ananthanarayanan (Microsoft Research)
10:30- 11:00	Enabling Lightweight Multi-tenancy at the Network's Extreme Edge	Suman Banerjee (Univ of Wisconsin, Madison)
11:00 – 11:30	Edge-to-cloud computing infrastructure inspired by the emerging needs of Telco applications.	Kandan Kathirvel (AT&T)
11:30 – 12:00	Enabling distributed, compute-intensive FaaS on the edge with COMPSs	Francesc Lordan (Barcelona Supercomputing Center)
12:00 – 1:30	Lunch	
1:30 – 2:30	Keynote #2: Computing at the Edge: Sensors, Learning, and Adaptation	Daniel Reed (University of Utah)
2:30 – 3:30	Panel Discussion: "Vision for the Future"	