IEEE Rebooting Computing Initiative:
part of the IEEE Future Directions Committee

Change is coming to the computing industry

Let’s talk and think about it so we can be prepared

IEEE = Institute of Electrical and Electronics Engineers
Motivation

End of Moore’s Law
  Opportunities for new approaches

Continued growth of computing devices for non-scientific applications
  Smart phone, social networking, analytics

Increasing coupling of cyber-physical systems
  Internet of Things

Let’s take a look at computing in a general, holistic way
Purpose

Learning/insight

Roadmaps

Initiatives

Collaborations

Advocacy/communication

Proper role for the IEEE
Activities

Held 3 technical summits over the past 18 months

Formally collaborating with ITRS 2.0
  (ITRS = International Technology Roadmap for Semiconductors)

Low power image recognition challenge at this year’s DAC
  (DAC = Design Automation Conference)

Special issue on rebooting computing in December IEEE Computer

December workshop to be held in DC after IEDM conference
  (IEDM = International Electron Devices Meeting)

Initial planning for a conference in 2016 is underway
RC1 summit

December 2013 in Washington DC

Four invited talks (DARPA, IARPA, OSTP, IBM) followed by small group discussions

The talks provided context for a brainstorming activity – what current computing problems have been “magically solved’ by 2023

Highlight: Identified 3 pillars for rebooting computing

Energy efficiency
Security
Human-computer interface

OSTP = Office of Science and Technology of the President, I hope you know the others
RC2 summit

May 2014 in Santa Cruz

Invited speakers described potential future models of computing:
- Augmented CMOS
- Approximate/Probabilistic
- Neuromorphic
- Adiabatic/reversible

Small group discussions and a poster session

Highlight: Different models of computing are essentially complementary, not competitive
RC3 summit

October 2014 in Santa Cruz

Four invited talks
  Security & privacy
  Parallelism
  Approximate computing
  Human computer interface

Small group discussions and a poster session
Low power image recognition challenge announced
Sneak peek at the National Strategic Computing Initiative

Highlight: Initial discussions on possible roadmaps, initiatives, and the IEEE role
More information

IEEE RC website at rebootingcomputing.ieee.org
  Details and reports from each summit
  Articles
  IEEE RC Committee information
  Related IEEE events
  Join the RC community to keep up to date on events and activities