

# COMMUNICATION 2020 AND BEYOND - ON THE ROAD TO AUTONOMIC COMMUNICATION

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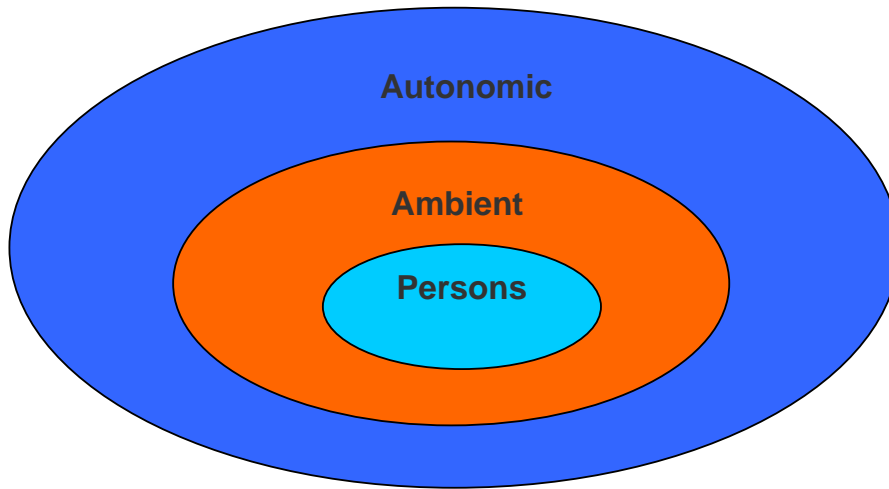
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## ISSUES

- What will the wireless and mobile communication landscape look like 10-15 years from now?
- What are the disruptive technologies? The enabling technologies?
- What is Autonomic Communication?
- What do we foresee on the road to Communication 2020 and Beyond?

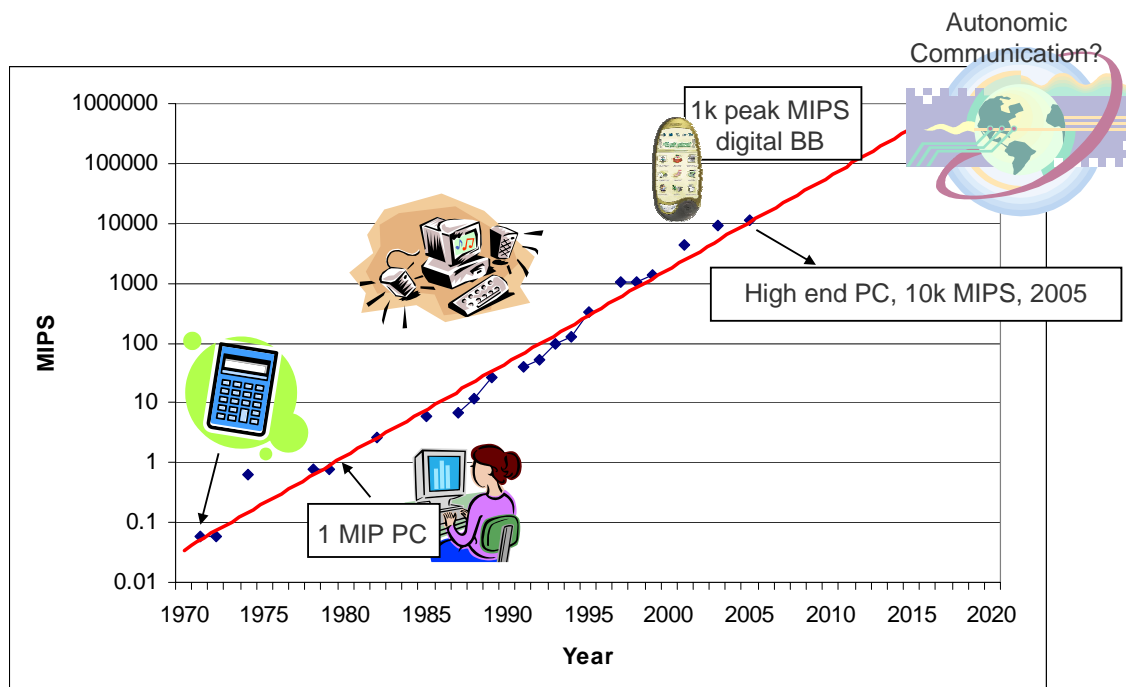
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# THE CORE



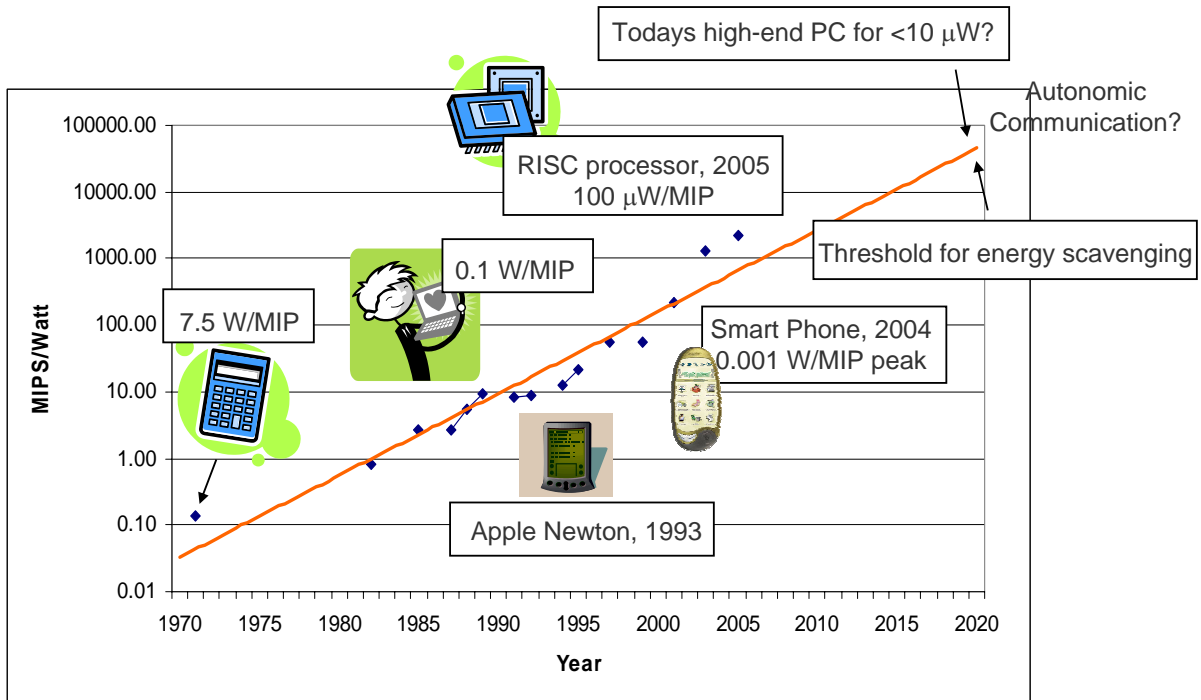
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## MEGA INSTRUCTIONS PER SECOND (MIPS)



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# MIPS PER WATT AND WATTS/MIP

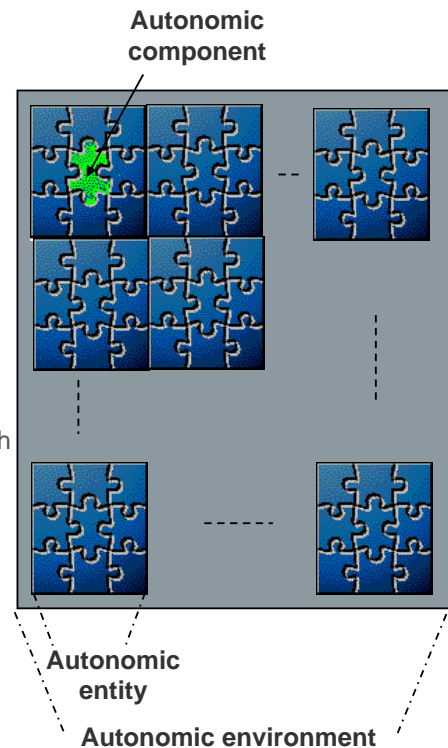


1. Xemics-CSEM CoolRISC processor



## BASIC ELEMENT: AUTONOMIC COMPONENT

- An autonomic component:
  - Basic atom for autonomic applications and systems
  - Modular unit with specified interfaces, clear context dependencies and specific mechanisms for self-management
  - Responsible for providing its services according to the system constraints (requirements, resources...)
  - Capable of managing its behavior in accordance with rules, context and policies
  - Capable of interacting with other autonomic components
- Related issues: functional, operational and control aspects



# AUTONOMIC COMMUNICATION STRATEGY

- Autonomic elements (components/services)
  - *Responsible for policy-driven self-management of individual components*
  
- Interactions between component elements
  - *In accordance with policies*
  - *Following the agreements established by component elements*
  - *Leading to consistency, robustness and self-management of the system*

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## CONCLUDING REMARKS

- Much more research is required to identify the thresholds and define the requirements on the road to Autonomic Communication
  
- If we consider the thresholds for Autonomic Communication considered in this presentation as a point of reference, major advances may be required in not only computing, communications and networking, but also in manufacturing and power supply technologies.
  
- An increased dependency on short range wireless communication is foreseen for interfacing. Physical interfaces to networks and equipment as we know them may disappear
  
- The power of today's server and more, in  $< 100 \text{ mm}^3$  package, consuming  $1 \mu\text{W}$ ?
  - Computational power for situated and autonomic communications and networking.
  - Precise localisation, sensing, sounding and the ability to adapt to the environment, traffic load, service or even the requested functionality.
  - Ultra lower power consumption, self-sustained operation over years (target: energy scavenging for future wearable and sensor systems)
  - Ultra small size and low cost yet ubiquitous nodes, capable of distributed processing and highly adaptive (target: Smart Dust-like).

***Autonomic Communication at a size we can swallow and...***

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Thank you

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