AC Roadmap

- Roadmap: a path from now to full AC
  - and maybe beyond
- Now
  - Brittle systems, require babysitting, blackbox
    Internet, blue screen, viruses,…
- Full AC
  - Full autonomic operation: underlying systems
    conspire to do what we want automatically
  - Self-everything?
- Beyond AC: life after AC
  - Intelligence? Autonomy? Creation?
Roadmap phases

- **Phase 0:** now: establish the field
  - Definition
  - Funding actions, dissemination
- **Phase 1:** 4 years: establish foundations
- **Phase 2:** move forward, advanced aspects
  - FP7 (2007-13) and worldwide
- **Phase 3:** maturity and beyond
  - Research: Beyond AC?
  - Society: use of AC-based mature solutions

Phase 0

- **Definition:** TO DO NOW!
  - What is AC?
  - What is not AC?
    - We must agree!
- **Funding actions, dissemination**
  - (Well) done!
    - WAC 04, WAC 05, ...
    - Countless AC sessions in conferences, workshops, ...
    - FET S&AC
What is AC? Tentative definition

- Systems that do what we want without direct human supervision
  - Context, knowledge
  - Conflict resolution, policies
  - Performance evaluation and feedback
- By themselves: self-*
  - Self-organization and emergence
  - Self-management
    - Self-protect (security, immunity)
    - Self-diagnose (detect)
    - Self-heal (correct, repair, recover)
    - Self-configure, self-update
    - Self-optimize, self-adapt, self-evolve
    - Self-deploy, self-deprecate

What is not AC

- Too many self-*?
- Related areas
  - Pervasive, ubiquitous computing
    - might benefit from autonomies, but are not autonomies
  - Autonomic computing
    - AC inherits (partial) name and motivation, but not necessarily the techniques
  - Networking
    - AC is networking, but networking is not AC: study of algorithms/protocols in isolation, very small networks, human controlled/managed, not self-*, ...
AC Measure?

- Instead of binary definition (AC or not AC)
- A measure of the “autonomicity” of a system, [0;1]
  - E.g. weighted sum of different criteria in the definition?
  - Inversely proportional to the amount of human intervention (and invention?) required
- Pros: avoid in-out black-white
- Cons: complexity, ambiguity, risk of too wide scope

Phase 1: FET A&C

- HAGGLE: PSN, wireless, opportunistic networking, replace USB storage
- ANA: AC architecture and testbed: ANA@Home platform
- CASCADAS: pervasive AC, context & knowledge, AC component models
- BIONETS: bio-inspired AC, evolutionary protocols and services, socio-economic models
  - risk, time, futuristic
Phase 1: FET A&C

- **Expected results**
  - Well-established theoretical foundations for AC
  - Practical case studies with tested prototypes
    - AC@pocket
    - AC@meetings
    - AC@confs
    - AC@home (overlay)

Phase 2: FP7

- **AC in Mainstream IST**
  - End of DNS, DHCP, E2E obligation
  - Usability, acceptance, socio-economic issues

- **AC in FET**
  - Complex systems & emergence
  - Context & environment
  - Conflict resolution
  - Adaptation & evolution
  - Eternal software, autocatalytic systems
Phase 3

- **Society: use and benefit from AC**
  - If not by 2013, then we’ve failed!!
  - Measure of autonomicity = measure of AC success?

- **Research: Beyond AC? Life after AC?**
  - If everything autonomic, what is left to do?
    - Intelligence (autonomic < intelligent) ?
    - Autonomy (autonomic < autonomous) ?
    - Creation
      - automated software synthesis, self-engineering, self-producing, fully automated AC lifecycle, ...
      - automated research???