CLEARY GOTTLIEB

European Interoperability Framework v2.0

Open standards to promote software interoperability

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This presentation is for purposes of debate, and
does not bind clients such as IBM and ECIS or others

Networks characterize the modern world

- IT Networks are the backbone of many of these networks
  - Between people
    - Social networks
    - Business networks
  - Between people and things
    - Cognitive computing; cybernetics, immersive virtual environments; personal identification and authentication.
  - Between things (through embedded sensors): *Internet of things*
    - Transportation (traffic management, public transportation management)
    - Utilities (management of water and gas supply)
    - Energy (management of electricity supply)
    - Healthcare (patient data, remote monitoring)
    - Food (temperature-controlled supply chain)
    - etc

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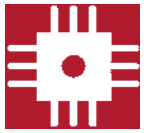


Our world is becoming

INSTRUMENTED

Our world is becoming

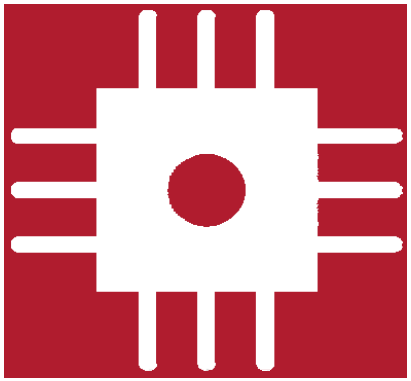
INTERCONNECTED

Virtually all things, processes and ways of working are becoming

INTELLIGENT

INSTRUMENTED

We now have the ability to measure, sense and see the exact condition of everything.



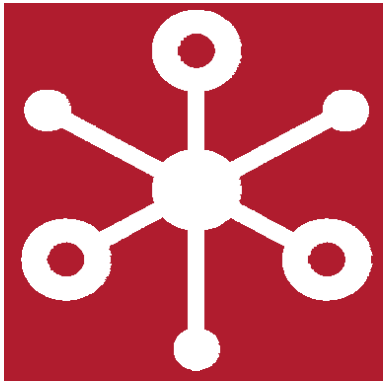
- Today, there are 1 billion transistors for each person on the planet.
- The types of sensors, actuators and other devices that can provide continual real world events is expanding, while costs drop.
- Wired and wireless networking solutions to connect them are nearly ubiquitous (LAN, WAN, WiFi, WWAN, Bluetooth, Mesh)

We need investment in forward-looking instrumentation, based on open standards, to fully use these extremely diverse devices

Instrumented: To ensure the economic health, welfare and security of their citizens, smart governments will measure, sense, and connect the various instrumented systems and industries that drive our economy.

INTERCONNECTED

People, systems and objects can communicate and interact with each other in entirely new ways.



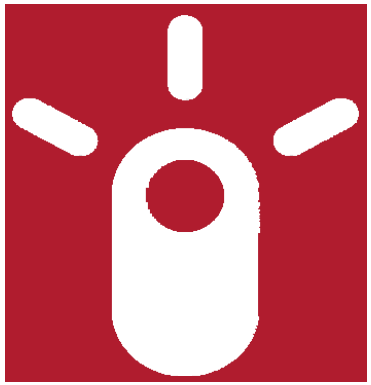
- The Internet of people is 1 billion strong. Almost one third of the world's population will be on the Web by 2011.
- 4 billion mobile phone subscribers worldwide
- More than 30% of citizens in OECD countries used the Internet to communicate with Government

Systems are heterogeneous. We need truly open architectures and standards for interoperability.

Interconnected: Smart Governments will also interconnect these disparate systems, industries, and government agencies.

INTELLIGENT

We can respond to changes quickly, accurately and securely, and get better results by predicting and optimizing for future events.



- Every day, 15 petabytes of new information are being generated. 8x more than the information in all U.S. libraries.
- An average company with 1,000 employees spend $5.3 million a year to find information stored on its servers.
- Standardization becomes key in making Intelligent decisions, and setting business rules based on historic trends.

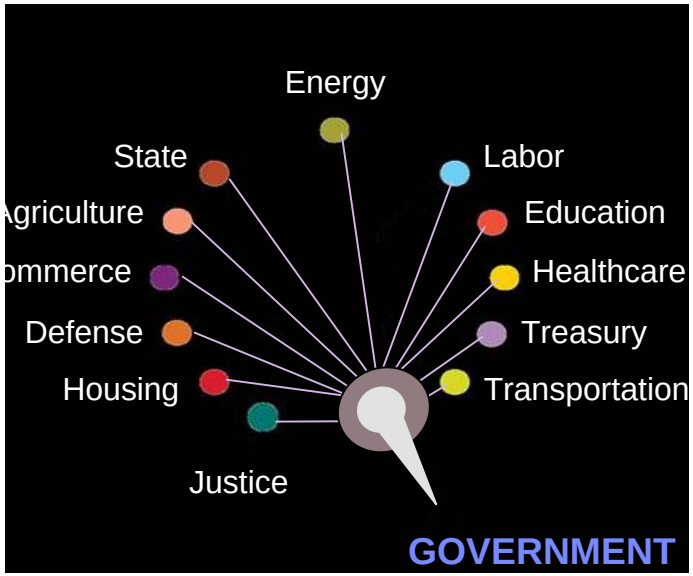
We need open standards to gather, search and mine data at record pace, for better visualization capabilities, and for more predictive capacity in real-time in order to make intelligent decisions, especially as the volume of available data grows.

Intelligent: Smarter governments analyze, apply and share information from multiple sources to assess situations and react quickly.

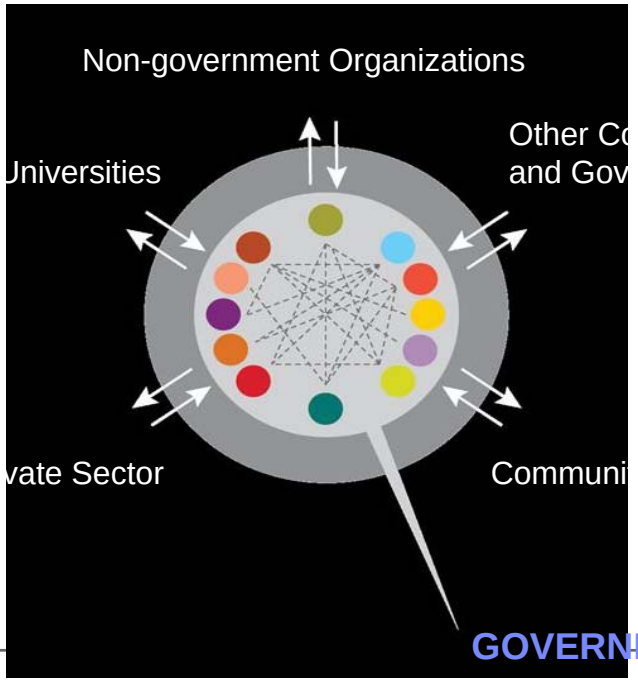
How do we ensure that investments in strategic platforms enable future innovation, competition and long term citizen value, and also provide short term value through consumable pilots building upon one another?

interoperability

20TH CENTURY GOVERNMENT



21ST CENTURY GOVERNMENT



EU recognizes need for Interoperability

- **Digital Agenda 2010**
  - **Section 2.2. - Interoperability and standards**: *"We need effective interoperability between IT products and services to build a truly digital society. The internet is the best example of the power of technical interoperability. Its open architecture gave interoperable devices and applications to billions around the world. … interoperability between devices, applications, data repositories, services and networks must be further enhanced.".*
  - **Section 2.8. - International aspects of the Digital Agenda**: *"Interoperability and standards recognised at the world scale can help promote more rapid innovation by lowering the risks and costs of new technologies."*
  - **Section 2.2.3 - Enhancing interoperability through coordination**: "*A key action to promote interoperability between public administrations will be the Commission's adoption of an ambitious European Interoperability Strategy and the European Interoperability Framework to be drawn up under the ISA programme […]. Since not all pervasive technologies are based on standards the benefits of interoperability risk being lost in such areas. The Commission will examine the feasibility of measures that could lead significant market players to license interoperability information while at the same time promoting innovation and competition."*

EU recognizes need for Interoperability

Neelie Kroes Address at Open Forum Europe 2010 Summit: 'Openness at the heart of the EU Digital Agenda' Brussels, 10th June 2010:

- *"Interoperability boosts competition and we need more of that. […] Public and private procurers of technology should be smart and build their systems as much as possible on standards that everybody can use and implement without constraints: this is good for the bottom-line because it promotes competition between suppliers and prevents vendor lock-in."* (p. 2)

- "*For me, it is a fundamental tenet that public administrations spending tax-payers' money should opt for the least constraining solution that meets the requirements for a given need. Such a rule, as the default, would shield public authorities from the dangers of long-term lock-in. It would also ensure competition between suppliers for follow-up contracts and for services. Opting for closed solutions would be possible, but on the basis of a clear justification, rather than because it was the easy option.*" (p. 5)

How do we get interoperability?

- Let market forces decide ("competing standards" or competing closed systems)?
  - Delays interop, and higher costs, as competition plays out (US v EU mobile telephony)
  - Might be creative chaos but liable to manipulation
  - results in monoculture as network effects kick in
- Use Antitrust Law to curb excesses (requires dominance and *ad hoc* analysis)
- Encourage voluntary standards and pooling (may not achieve market success)
- Legislation or Interoperability Directive (too rigid, one-size-fits-all?)
- Change patent laws to encourage "soft patents" (necessary but not enough)
- Change in Government procurement policies so as to drive general adoption
  - L. DeNardis: "*governments, as significant parts of technology markets, can most effectively exert market influence as well as provide effective e-Governance through procurement policies that promote open standards*" (*E-governance Policies For Interoperability And Open Standards,* Yale Information Society Project Working Paper, p. 2*)*
  - EU led the world in 2004; chance to do so again (N. Kroes' June 2010: *"the Commission has a unique opportunity with the adoption of the EIF version 2 to reaffirm its lead in this area.")*

So we can get Interoperability through procurement – But what kind of Interoperability?

- Option 1: Interop with Open Standards connecting Diverse Systems
- **Draft EIFv1.0 (2004)**:

  – *The standard is adopted and will be maintained by a not-for-profit organisation, and its ongoing development occurs on the basis of an open decision-making procedure available to all interested parties (consensus or majority decision etc.).*

  – *The standard has been published and the standard specification document is available either freely or at a nominal charge. It must be permissible to all to copy, distribute and use it for no fee or at a nominal fee.*

  – *The intellectual property - i.e. patents possibly present - of (parts of) the standard is made irrevocably available on a royalty free basis.*

  – *There are no constraints on the re-use of the standard."* (p. 9)

Interoperability through open standards

- Advantages of open standards (RAND Report):
  - Open communication between systems in a network
  - Competition on the merits rather than on ability to exclude rivals
  - Allows new entrants to interoperate with an incumbent
  - Customers choice and avoids lock-in
  - “Best of breed” product in a network has a chance to win
  - Allows customization of individual applications, allowing users and suppliers freedom to develop and satisfy diverse preferences
  - High quality of service and reasonable prices
  - Allow focus on innovation and new features, and not in reverse-engineering for the purpose of enabling interoperability
- Possible disadvantages (RAND Report):
  - Might discourage 'breakout' innovation
  - Standard-setting can be slow (See also L.DeNardis, *E-governance Policies For Interoperability And Open Standards,* Yale Information Society Project Working Paper, p. 11)

Interoperability through open standards

– *"This public (-spirited) lead strongly reinforces open technologies so that firms have to compete (and make their money) on the merits of what they provide rather than the ability to exclude rivals. Indeed, interoperability and low entry barriers lead to a high degree of customization in individual applications; allowing customers and other civil society stakeholders considerable latitude to develop and satisfy diverse preferences. This interoperability is thus a powerful public good, and governments are particularly vigilant against the risk of foreclosure by 'bottleneck' firms or proprietary standards, using antitrust regulation, support for open standards and targeted public procurement to ensure a sustainably level playing field with high quality of service and reasonable prices.*"

  – (RAND Report, "*Connected World*", pp. xix and 43)

What kind of interoperability? – The Antithesis

- Other end of the spectrum: Interoperability within a monoculture
- Draft EIFv2.0 (Nov 2009): *"… interoperability can be obtained without openness, for example via **homogeneity** of the ICT systems, which implies that all partners use, or agree to use, the same solution to implement a European Public Service."* (section 2.10, p. 11)
- Practical Effects and Disadvantages of "monoculture" interoperability
  - Absence of product diversity
  - Barriers to entry
  - Consumer lock-in,
  - High prices,
  - Reduced innovation
  - Security vulnerability
  - Democratic and efficiency issues (See L.DeNardis, *E-governance Policies For Interoperability And Open Standards,* Yale Information Society Project Working Paper)

What kind of interoperability? – The Synthesis

- **Draft EIFv2.0 (2010)**:
- *"**2.10 Underlying Principle 9: Openness** - Interoperability involves the sharing of information and knowledge between interacting organisations, hence implies openness. Specifications, software and software development methods that promote collaboration and the results of which can freely be accessed, reused and shared are considered open and may lead to gains in efficiency, while non-documented, proprietary specifications, proprietary software and the reluctance or resistance to reuse solutions, i.e. the "not invented here" syndrome, are considered closed."* (pp. 10-11)
- "***5.2.1 Specifications, openness and re-use*** - *If openness is applied in full:*
  - *All stakeholders have the same possibility of contributing to the elaboration of the specification and public review;*
  - *The specification document is freely available for everybody to copy, distribute and use;*
  - *The specification can be freely implemented and shared under different software development approaches (For instance, Open Source or proprietary software and technologies…."* (p. 25)

The Synthesis – coexistence of RF Software interoperability and FRAND telecom interoperability

- In software interoperability RF open standards are becoming prevalent.
  - Openness does not prevent innovation: "*it is highly 'generative' as it allows and forces bottom-up [user-driven] innovation*" (RAND Report, p. 165)
  - FRAND is too uncertain/open to debate (some say "meaningless" after *Qualcomm*)
  - New revenue models show IPRs are not the only model to encourage innovation
    - Internet open standards are IPR-free and used for a myriad of goods and products
    - Open source software does not rely on royalty income, but is innovative
    - Advertising-funded services do not rely on fees to users, but are innovative
    - Two-sided markets: giving away one product to generate demand for a fee-paying product
    - For non-dominant firms, system interoperability is valuable and the norm
    - Soft patent (Art 20 of Patent Directive)
- And EIF is nuanced: *"public administrations may decide to use less open specifications, in case open specifications do not exist or do not meet the functional interoperability needs."*

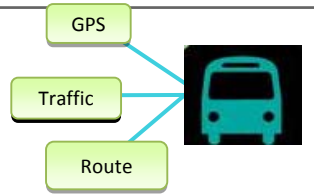
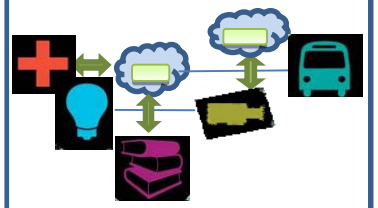
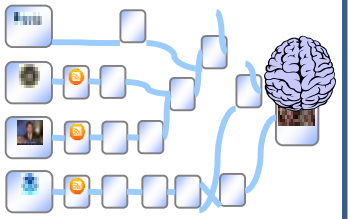
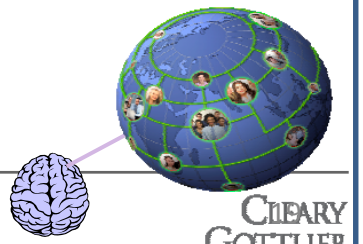
The Synthesis – coexistence of RF Software interoperability and FRAND telecom interoperability

- Experience shows that in the telecom sector intellectual property rights are needed for innovation, and FRAND licensing is (or should be) the norm for telecom interconnection technology.
- EIF does not target consumer telecommunications or entertainment devices, but focuses on PEGS (Pan European Governmental Services)
  - Does not affect FRAND licensing in telecom or other areas
- EIF is nuanced since it does not constrain proprietary systems so long as they interoperate
  - Requiring RF for open standards allows proprietary systems to co-exist (so long as the software interoperability standards are RF).
  - Allowing FRAND for standards kills open source alternative (because open source cannot accommodate FRAND royalties and field of use restrictions). This could lead to “monoculture”.
  - So the former provides more choice and is the more balanced approach.

Definition of open standards

- L. DeNardis: most Interoperability Frameworks have three things : guiding principles, a definition of open standards and guidelines for compliance (p. 22-31).
- Definition is based on openness in development, implementation and use (p. 24).
- A standard is open if developed under the following principles:
  - Pro-competitive goals
  - Open, transparent, collaborative and undistorted adoption process
  - No overstandardization – Platform-independent and vendor-neutral standard that can be implemented in competing ways
  - Open access to the standard
    - Essential patents available under RF terms that do not discriminate against open source (IT) or FRAND licensing (telecom)
    - No patent traps; no “hold-up”
    - Formulation should enable all implementations to interoperate
    - Open and full publication of specifications and documentation

Guidelines for Evaluating Openness

Instrumented	➢ Are all of the device interfaces operating-system independent and are specifications publicly available? ➢ Can all the devices support multiple connection types (wired or wireless)? ➢ Can standards-based interfaces be used within the architecture for the sensor event payloads and transport?	
Interconnected	➢ Can all the information sources and information collectors speak the same language? (ie. are they interoperable?) ➢ Can data easily be retrieved? Or are there application specific transport that will require specialized code/clients to access? ➢ Are there multiple implementations available?	
Intelligent	➢ Can the data be accessed and read (or is in some private cloud, DB or proprietary application) and can "rules" be applied to the data in a consistent manner no matter how it was gathered? ➢ Can it be stored/archived in a common format for historic trend analysis over time? ➢ Are you able to support heterogeneous structured and unstructured data sources to gleam intelligence?	
Citizen-Focused	➢ Can various audiences collaborate together when their interfaces will be heterogeneous (desktop clients, browsers, phones, etc)? ➢ Is this collaboration seamless, easy and agile with appropriate identify management, security, privacy, policies be applied? ➢ Are "deliverables" maintained in a open document format for archival and use in the future?	

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