Architecture for Future Internet

Keith Howker
TSSG, Waterford Institute of Technology
Coordination Action Effectsplus
what do we mean by Future Internet – FI?

- early FIArch direction close to current Internet
- do we need architecture to cover the whole of FI assemblage? - "FI" as in FIA, FISA, FIA Roadmap, ...
  - how do things fit together?
  - coherent set of common goals and shared design principles
  - what are "key architectural issues"?

- effectsplus special interests
  - Trust &Security as an integral part of architecture
  - Architecture ↔ Roadmap
    - Architecture dependencies into Roadmap
    - Roadmap dependencies into Architecture
scope of FI architecture?

1. original proposal
   *take into account the wider needs of the FIA community*

2. do we need to go further?
   partition the architectural work to cover *(also)*
   - extend current Internet approach
   - high-level interoperability and common elements, *(service-ish, cloudy)*
     eg, identity, accountability, policy, QoS, … , + APIs
   - generalised inter-process communication
   - longer-term architectural goals for networks + clients

3. how to coordinate action on a wider front ?
building interactive relationship necessary

architecture for roadmap & roadmap for architecture

- FIA
- FP projects
- FI-PPP
- IETF
- W3C
- dedicated interests
  - trust
  - privacy
  - identity
  - federation
  - IoT
  - IoS
  - Io*
  - architecture
  - ...

roadmappers requirements to architects

architects requirements to roadmappers

FIArch - 23-MAY-2011
some design principles – or goals

- service composition/federation*
- interoperability of services and entities*
- dynamics and mobility*
- heterogeneity*
- gateway services
- cross-layer needs
- modularity – reusable/replaceable components
- compartmentalisation & containment
- simplicity and understandability → manageability & control

* and hence ‘support for dynamic composition/re-composition/decomposition (or federation) of interoperable heterogeneous services and components’
thanks!
extras
whereas ...

(i) the FI roadmap contents will have architectural needs and implications
(ii) the FI roadmap should include these architectural needs
(iii) the architecture for FI should itself have a roadmap
(iv) the scope of an architecture for FI should cover these needs
(v) the current FIArch direction does not cover a large part of the architectural needs of the FI roadmap contents

then

(vi) the architectural work for FI should be extended to cover this wider scope, and align with the Roadmap – and the Roadmap should reflect the needs of the Architecture
examples of coverage

not intended to be at all exclusive
(a) negotiation and operation of QoS agreements
(b) the inter-operation of policy, and in particular security policy
(c) interoperation of e-identity management and use
   (assumed to be non-uniform)
(d) interoperation of accountability and its consequences
(e) an extended GSSAPI to provide accessibility and usability
(f) privacy
(g) data-protection \}
    (and therefore, access-control, delegation, … )
(h) the development of independent (sub-)frameworks for certain topics
   ▪ technical aspects necessary for interoperability within a
     heterogeneous family,
   ▪ necessary legal and regulatory support to make things work in the
     real world
(i) the inter-relationships of these (eg, role of identity in accountability)
(j) consideration of a platform (cf PPP – what could be the relationship?) comprising and integrating sub-frameworks
**extend** current Internet: architecture/structure; functionality
- FIArch activity
- IETF-based

**exploit** current Internet
- how to get the most out of the current structure: nuts and bolts fixes & shim
- how to provide usefulness/interoperability of/for Internet users/stakeholders
  - needs of FIA members,
  - needs of PPPs, etc.
  - common requirements of services, etc.
towards a Future Internet
- future networking & internetworking

- theoretical & analytical
  generalised inter-process communication
  - requirements for architecture(s)
  - underlying structures of a future (inter-)network

- practical & experimental
  - investigation of architectures
  - detailing
  - prototyping
  - trialling