Foggy Business Models don’t need to be Misty
• A foggy landscape with applications
  – logistics
  – traffic
• Foggy qualities and stakeholders
• Foggy strategies and business models
• Foggy business model design
  – Demystifying collaborations
• Conclusions
A Foggy Landscape with Applications
Devices/Applications

OpenFog Services

OpenFog Fabric

Cloud Services

DevOps

Security

Adapted from: OpenFog Architecture Overview
OpenFog Architecture Working Group
Foggy container handling?
Foggy traffic management? ITS!
ITS Reference Architecture (Level 0)

- Support
- Central
- Roadside
- Vehicle
- Traveler/VRU
ITS Reference Architecture (Level 2)

Dynamic Foggy Architecture
Foggy Qualities and Stakeholders
OpenFog Pillars

Security:
- Trust
- Attestation
- Privacy

Scalability:
- Localized cmd, ctrl, & processing
- Orchestration & Analytics
- Avoidance of network taxes

Open:
- Resource visibility & control
- White box decision making
- Interop & Data normalization

Autonomy:
- Flexible
- Cognition & agility
- Value of data

Programmability:
- Programmable SW/HW
- Virtualization & multi-tenant
- App Fluidity

Hierarchy:
- Fully cloud enabled
- Computational & System
- Autonomy at all levels

Agility:
- Tactical & strategic decision making
- Data to wisdom

From: OpenFog Architecture Overview
OpenFog Architecture Working Group
OpenFog Pillars – Important to whom?

From: OpenFog Architecture Overview
OpenFog Architecture Working Group

Security:
- Trust
- Attestation
- Privacy

Scalability:
- Localized cmd, mon, & processing
- Orchestration, analysis & workflow
- Avoidance of bottlenecks

Open:
- Resource visibility & control
- Bottom-up decision making
- Error & Data normalization

Developers / Software

Infrastruture

Deployers / Operators

End Users

Autonomy:
- Flexible
- Cognition & agility
- Value of data

RAS:
- Reliability
- Availability
- Serviceability

Programmability:
- Programmable SW/HW
- Virtualization & multiple layers
- Agility

Hierarchy:
- Full fault enabled
- Compositional & System
- Autonomy at all levels

Tactical & strategic decision making
- Data to wisdom
• Interoperability – device heterogeneity
  – protocol heterogeneity
• Interoperability - data transfer
  – message syntax standards
  – really a problem?
• Interoperability - data interpretation
  – data semantics
  – ontologies?

What mistifies the fog - technology?
• Data ownership
  – in logistics scenarios:
    • parties may be (often are) reluctant to share data for competitive reasons (e.g. job snatching, competitor profiling)
    • parties see data as a competitive advantage – but often don’t know how precisely
  – in mobility scenarios:
    • traffic participants may be reluctant to share data for privacy reasons
    • regulations may obstruct data sharing (even if participants are OK)
• Cost/benefit sharing
  – parties do not have a clear vision of who pays what
  – financial (easy to quantify) vs. non-financial (hard to quantify) cost/benefits
  – strategic (infrastructure) costs vs. tactic/operational (process) costs

• Data sharing is a form of cost/benefit sharing
  – data should have an explicit value
  – that can be traded against other values

• Business models in new technology settings (such as Fog Computing) need demistification
Foggy Strategies vs. Foggy Business Models
Demistifying foggy business means distinguishing between two levels.

**Strategic level:** thinking long-term about foggy infrastructure costs/benefit projections
- as business relations change faster than infrastructure setups, these projections cannot be based only on current/short term business relation thinking.

**Tactical level:** thinking medium-term about foggy business scenarios (~ use cases from a technical perspective)
- these have to rely on functionality offered by existing infrastructures.

**Business at the strategic and tactic levels**
strategic positioning ecosystem view (evolving)

A1

A2

A3

A4

tactic collaboration ecosystem view (revolving)

Actors, strategies and business models
• Multi-party collaborative (networked)
• At the tactical level (not resource-oriented)
• Starting from value-in-use
• For a specific customer segment
• Highlighting for every party
  – its contribution to value-in-use
  – its activities to realize that contribution
  – its cost and benefits related to its role
• Addressing all costs and benefits
  – financial and non-financial
• Supporting analysis at the network level
The value-in-use: what is the added value for the customer?

Who is the customer?
What are the elements that parties in the network contribute to the value-in-use?
Which activities must be performed by the network in collaboration to realize the value-in-use?
What are the costs/benefits for each actor (financial and non-financial) – and does this lead to a viable business network?
Google

Advertiser

+ attention

- fee

+ search

- fee

create pages

create content

content

visibility

view pages

presence

actor coproduction activity

actor value proposition

actor cost/benefit

+ search - attention

Customized Advertising
Foggy traffic management? ITS!
Traffic Information Service with Floating Car Data Collection

Shockwave Damping

Road Works Warning

Example business models for ITS
Example SDBMR

Shockwave Damping
Conclusions
From business models to architecture
Definition of MISTY

mistier; mistiest

1

a

: obscured by mist

b

: consisting of or marked by mist

2

a

: INDISTINCT <a misty recollection of the event>

b

: VAGUE, CONFUSED <avoided the large, vague, misty issues — Reuben Abel>

3

: TEARFUL