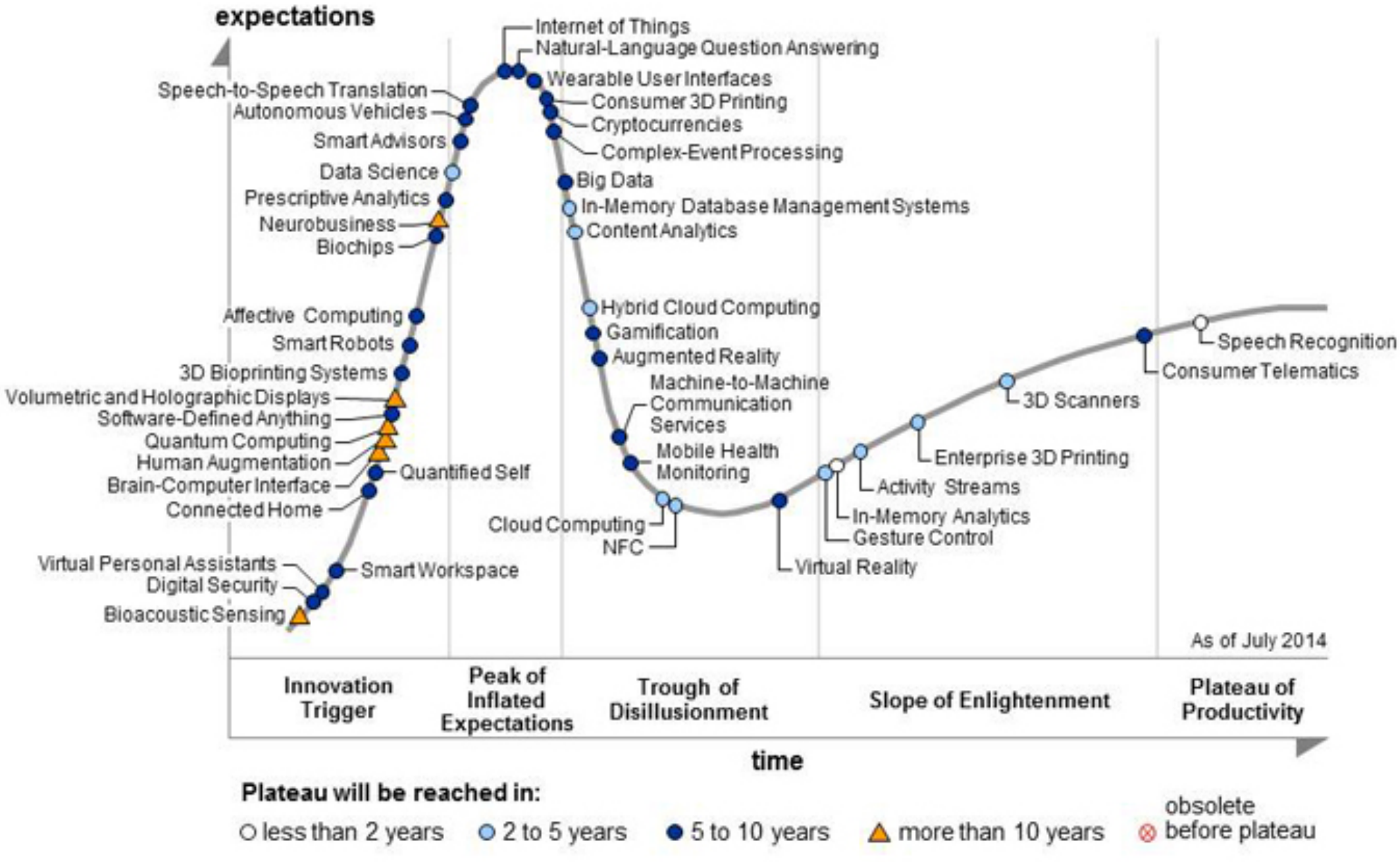
A view from an AllJoyn analyzer/participant

Dave Thaler


expectations
Internet of Things
Natural-Language Question Answering
Wearable User Interfaces
Consumer 3D Printing
Cryptocurrencies
Complex-Event Processing
Big Data
In-Memory Database Management Systems
Content Analytics
Hybrid Cloud Computing
Gamification
Augmented Reality
Machine-to-Machine Communication Services
Mobile Health Monitoring
Cloud Computing
NFC
Virtual Reality
In-Memory Analytics
Gesture Control
Activity Streams
Enterprise 3D Printing
3D Scanners
Consumer Telematics
Speech Recognition
Speech-to-Speech Translation
Autonomous Vehicles
Smart Advisors
Data Science
Prescriptive Analytics
Neurobusiness
Biochips
Affective Computing
Smart Robots
3D Bioprinting Systems
Volumetric and Holographic Displays
Software-Defined Anything
Quantum Computing
Human Augmentation
Brain-Computer Interface
Connected Home
Quantified Self
Virtual Personal Assistants
Digital Security
Bioacoustic Sensing
Smart Workspace
As of July 2014
Innovation Trigger
Peak of Inflated Expectations
Trough of Disillusionment
Slope of Enlightenment
Plateau of Productivity
time
Plateau will be reached in:
less than 2 years
2 to 5 years
5 to 10 years
more than 10 years
obsolete before plateau

The industry isn't staying still

- Getting smart object engineers to become aware of research is an issue…
  - Often they only become aware of standards (IF they even do that)
  - And maybe learnings from competing ecosystems (but often not)
- Research & standards both take a while
  - but people will do stuff in the meantime
- Need research around things that have **immediate practical impact**:
  - How are things working and not working?
  - What are the limits?
  - How might issues be addressed?
  - How do you do deal with heterogeneity of competing ecosystems?
  - Economic/RFC5218 analysis of protocols & ecosystems

AllSeen Alliance is a consortium
AllJoyn is the open-source project

- AllJoyn:
  - Cross-platform (Linux/Android, Windows, iOS, etc.), multiple languages (C, C++, Java, etc.)
  - Predominantly IP-based (mostly IPv4) but non-IP lower layers allowed
    - Stack is: app/AllJoyn/D-Bus'/TCP-or-UDP/IP + app/AllJoyn/DNS-SD/mDNS'/IP
  - RPC-like communication with Properties, Methods, and Signals
    - "RPC-like" since async message based underneath
  - Has devices in market (LG TVs, Panasonic speakers, water heaters, etc.)
    - https://allseenalliance.org/showcase
  - Focuses on proximal network only, requires ALG to get out
- AllSeen Alliance:
  - has two types of WGs…
    - A) protocol, security model, etc. but no (yet) formal protocol specs per se, just overviews and code
      - E.g. using "application manifests"
    - B) formal device-specific schemas (in D-Bus introspection XML format)
  - Discussion happens on public mailing lists and conf calls

Some practical examples

- Security & privacy:
  - Security/trust models, esp. when have heterogeneous protocols
    - Usability research would also be very useful here
  - Privacy e.g. ownership changes, watching airwaves, etc.
  - How do you secure class 0 devices effectively?
    - Physical security? Uses of asymmetric-work crypto? Etc.
  - How safe is 8-byte authentication tag length ?
- Data model taxonomy, esp. when have heterogeneous protocols
  - How can you efficiently map between them?
- Auto election of "best" router/relay to pick (based on powered-ness, version, load, internet-connected or not, L2 media type, etc.)
- What would convince consumers to want smart objects?
- How securely get a description you can trust of what a device will do?