Ubiquitous Structured Data: The Cloud as a Semantic Platform

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The Cloud is the Great White Hope

(So to speak)

Massive problems remain untackled

• Little thinking about how the cloud integrates with devices
• Less thinking about how people will be able to conceptualize it
• Even less thinking about how developers will be incented to invest

The root of the problem goes back to device UI
Observations, Motivation, Principles

• Simplicity and fitness for purpose are more important than features
  • The N95 & N97 crush the iPhone in capabilities, but iPhone is loved and admired
  • However, all current phones including iPhone, are a perpetuation of what is wrong

• Use concepts must remain constant – across phones and services
  • Based upon natural human dispositions, making them future-proof
  • Current user experiences present information in ways that don’t match how people organize information in their heads
  • We have not been consistent – mixed metaphors in different applications

• Presentations (what we see) and input modalities will keep evolving
  • Significant change will come in the next five years
  • Our model needs to be able to evolve virtually infinitely

• The industry flourishes when there is a standard platform
  • Many different programming metaphors and core services across models and manufacturers discourage developers
Start Over at the Concept Level
Humans Are Relational

• This is reflected in how we named ourselves in simpler times:
  • What you do
  • Where you live
  • Who / what you are
...we all instinctively resist becoming a “number”

Technology has helped, and hurt
• Telephones removed face-to-face conversations, assigned us numbers, but gave us convenience
• Email vanquished the handwritten letter
• ATMs took the personal banker out of the equation

We need to reverse the trend
Unifying Approach

• Consistent application of the noun-verb style
  • Select an object and then perform an action
  • Application-less, more human, less “computer”
• Consistent use of one common data-structure, the “Social Graph,” in all devices and for all services
  • Precisely captures the noun-verb metaphor
  • Forms the basis for the look-and-feel concept we seek – this is what we govern
  • Extensible and future-proof
  • Facilitates innovation of presentation and modalities
  • Can be made open while preserving proprietary presentation styles
• A way to extend that representation across users, across phones, and into the cloud
Review: Noun-Verb style

• Nouns represent people, places and things
  • Often called “objects”

• In the context of user interfaces, verbs are actions that can be applied to nouns
  • Some are fairly specific (Call a person)
  • Some are more generic (Cut/Copy/Paste apply to all objects)

• The order is important in establishing the feel of the interface
  • Verb-noun order is the classic “application” UI: Send SMS, pick the recipient
    • Example: verbs that operate on music only appear in the music app
  • Noun-verb order is, in a strong sense, application-less: Select from a list, delete
    • Selecting an object brings up a list of the things you can do (the verbs)
  • Phone UIs are a mixture of verb-noun and noun-verb
    • Leads to confusion and frustration

• Arguably, noun-verb is more natural because it more readily matches the way people think about the world
  • Verb-noun is easier for programmers

• Even though noun-verb style is application-less, it is highly extensible
The Social Graph and the Rise of Facebook-Like Sites
But Facebook & Open Social Are Not Enough

- Sharing of information raises privacy issues
  - The SG framework allows for one consistent approach to grouping and protecting information that is related
    - Security contours

- Linking information across devices and to the cloud can be done economically and intelligently using modern techniques
  - Information signatures to detect changes to aggregated data
  - Local caching of remote information
  - Pre-fetching based on user activity (anticipating)
  - Summarization and intelligent compression to minimize bytes transferred

- Open extensibility essential
- Hosting needs to be a self-sustaining business – neutral, auditable
Whither The Standard Mobile Platform
## Evolution of the Computer

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<th>Mini</th>
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### Golden Age
- **Software**
- **Platform**

### Standard Platform
- **Buildup of Compatible Hardware**

### Value Shift to Software

### Value Shift to Services
Thinking Bigger

One Global Graph to Rule Them All

• With more devices live-linked, the value of the SG grows according to Metcalfe’s law
  • Value grows as the square of the number of users
• If opened, the global SG could become the standard mobile platform
  • Extensible
    • New noun types that leverage existing verbs
    • New verbs that expand the usefulness of existing nouns
    • New relationship types
  • Service oriented
    • Provides a very powerful framework for data-mining
      • Why? Structured user data is much more informative than raw user data
    • Service delivery can be highly tailored
    • Has the potential to shield developers from some device-specific coding
• Web-aware
  • Matches the evolution toward separation of data and representation and has the potential to accelerate this transformation
Powerful Possibilities
Thinking Smaller

• If the on-device information is organized as a SG, can SG browsing (in a simple way) be done on even very low end devices?
  • Answer not known but strong sense that this can be done
  • Clear value in expanding the base
  • Developers: one set of information sharing metaphors across the industry BUT…
  • …The tools that enable such a programming style MUST respect the “3 Watt Limit”

• The SG may provide a framework for extending the reach of our devices to wireless sensor networks
  • Services that reach through devices to the sensors beyond
In this example, each contact, which each has its own associated NOUNS, is mapped into a simple address book UI.

Visual presentation of the NOUNs is up to the phone developer, but the semantics and the links are not.

Problems to solve: caching and memoization, coding/representation, synchronization, offline access.
One Graph

Many Possibilities

• Aggregating massive data sets in real-time
  • User’s interests
  • Patterns in behavior and movement
  • Collection of environmental sensory data
• Empowering users to reclaim their personal data
  • Constructing an open marketplace where users can reveal as much of their data as they desire in exchange for benefits or compensation
• Surfacing hidden connections
Surfacing The Unseen
Who Will Architect This Cloud?

No Single Entity

The answer is unclear…

• A standards body won’t be it. Too slow, too trailing.
• One company by fiat? No way.

Privacy and security demand a radical new model for data

• 100% user owned and controlled
• To be locked up, used, loaned, or sold, by the user as they see fit in an open marketplace

• What industry players already have portions of this solved?
• What new business opportunities does this generate?
Summary of the Concept

We propose a new application & data framework focused on simplicity, consistency and fitness for purpose that becomes the Standard Mobile Platform

• Clearly separates presentations (what we see) and input modalities from the concepts that the user needs to know

• Embodied in a Global Social Graph
  • The fundamental concept of noun-verb style
  • Extensible
  • Combines an on-device and a services UI point of view and blends them seamlessly
Challenges Abound

How will...

• we structure this data in a way that people will be able to conceptualize it? Make it “human” and natural?
• data migrate and update across these distributed systems?
• these devices cope with semi-connected environments?
• we insure privacy and security in such a dispersed data field?
• devices get smart enough to determine if it is optimal to process onboard or in the cloud?
• we create a true flexible marketplace for individuals’ data?
• we incent the developer community under this model?
We can't solve problems by using the same kind of thinking we used when we created them.

– Albert Einstein