



# Framework for Semantics in Web Services

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- Context/Vision
- Success Factors
- Challenge
- What should the W3C do? Now?

# Observations on Web Services

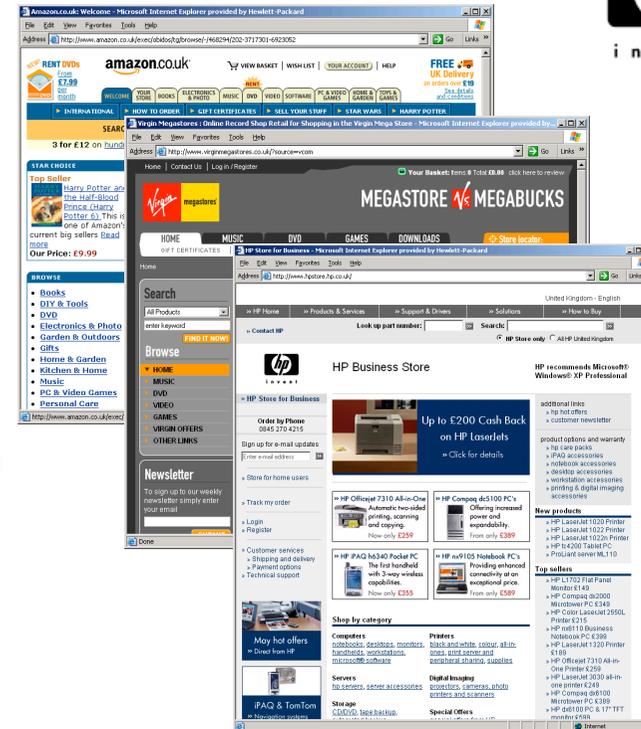


- A Web Service Interface provides a means to **interact** with a Service Provider.
- A WSDL description does not say :
  - WHAT a provider DOES.
  - WHAT an interaction DOES.
  - HOW to sequence operations.
- Multiple **different** Web Service Interfaces to equivalent Services.
- Multiple reinvention – trading community, geography...
  - isolated trading communities.

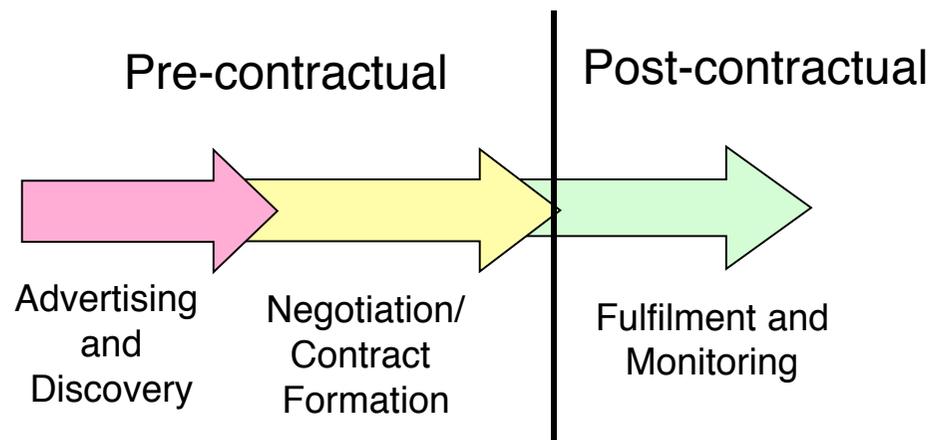


# Web Analogy

- B2C eCommerce Web Sites
  - Near ubiquitous Catalogue, Cart, Checkout conceptual model.
  - Human UI contains ongoing Process Description
    - Options for moving forward.
    - Consequences of action.
  - Significant differences between Providers:
    - ‘presentation’,
    - factoring of information gathering.
    - Message exchanged on the wire.
  
- WS Toolkits and Platforms lead to similar creativity and diversity for Web Services.
  - Alt. view is that there will be a smaller number of standardised WS interfaces.
  - Service and Interface Evolution, Differentiation



# Service Delivery Lifecycle



## What is a Service?

We think of a service as “an occurrence of an exchange of value.” likely subject to the terms of a contract.

eg. Specific goods delivered to your door in exchange for payment.

**For more see:**

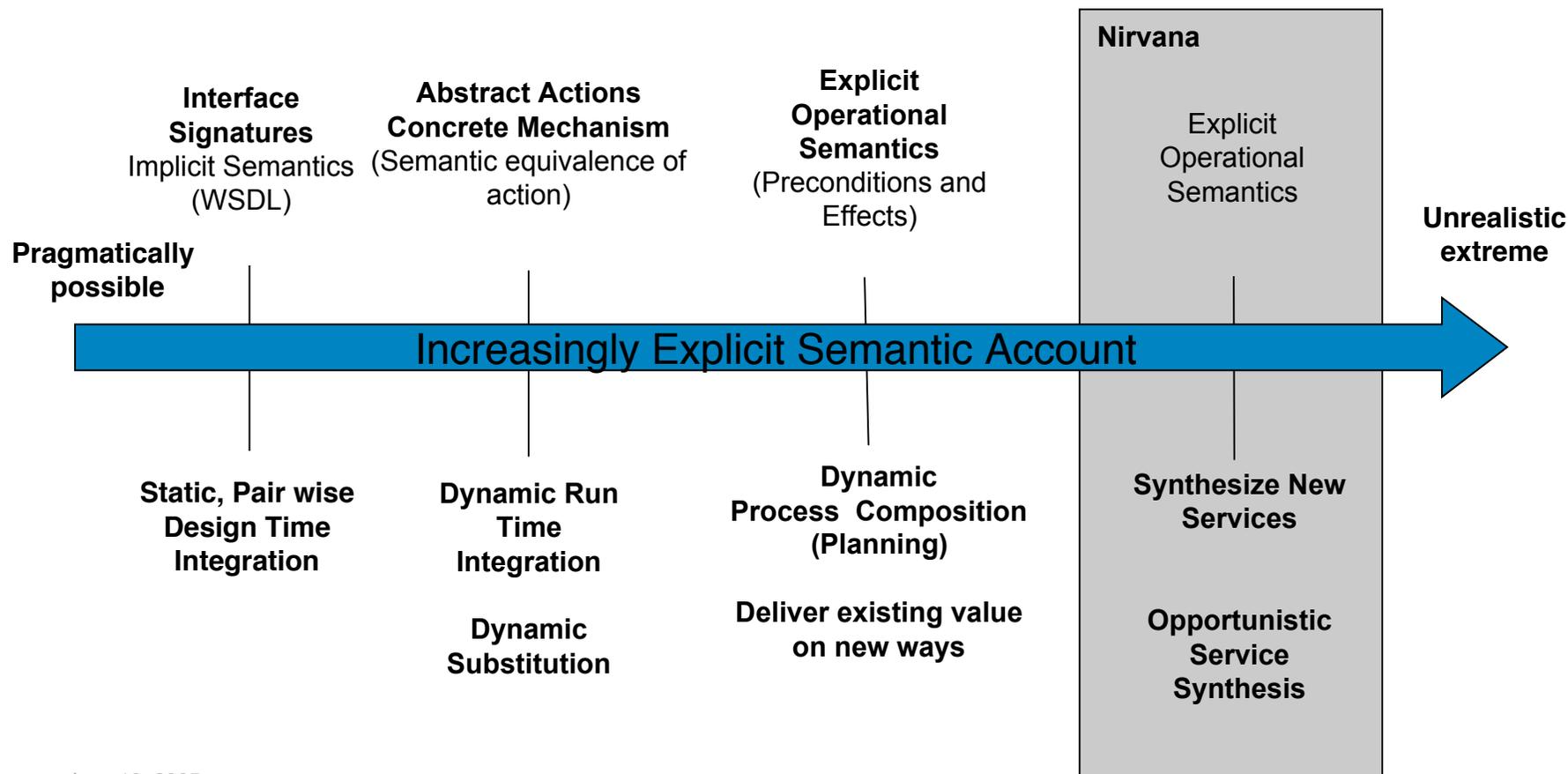
<http://www.hpl.hp.com/techreports/2004/HPL-2004-214.pdf>

- Advertising and Discovery
  - Matching potential providers with potential consumers
- Negotiation
  - Reaching agreement on Service to be provided (and compensation).
- Fulfilment and Monitoring
  - Delivery of service
  - Monitoring for contractual compliance.
  - Handling contingencies.
- All phases may involve Web Service Interactions



# Vision

- Enable an 'open' economy of Service Providers and Consumers.
  - Open in the sense that providers and consumers can come and go freely and freely form business relationships.
  - Reduce technology friction to the formation and maintenance of business relationship.
- Value proposition: Reduced integration costs and time.
  - Adaptability – Increasingly automated adaptation with semantic account.



# Why Bother?

<http://iswc2003.semanticweb.org/brodie.pdf> (Michael Brodie)



## Annual Grand Challenge Cost

- Integration's costs: **\$500 BN / year** worldwide
  - 24% of IT budgets \$180 B / year US (InfoWorld, January 2002 survey of 500 IT leaders)
  - 13% of IT spend \$100 B of \$752 B / year US (Giga estimate based on May 2002 report)
  - 25-40% of all IT projects (various)
  - 6% of US IT spending: \$34 B of \$610 B / year US (IDC, May 2002)
  - 7% of IT spending: \$90 B of \$1.3T / year worldwide (IDC, May 2002)
  - 28+% of all consulting: \$ 160 B / year worldwide (Gartner March 2002)
  - 43% of e-business consulting: \$53 B / year worldwide (Gartner)
  - 1.75% to annual IT budget on EAI and B2Bi (Forrester, Dec 2001)
  - 10-30% of IT budgets (David Sink, IBM quoted in InformationWeek, May 27, 2002)
- Data Quality's costs: **\$600 BN / year** US
  - Data Warehouse Institute, 2002
- Worldwide Annual Integration + Data Quality Costs: **\$1 Trillion / year**

14

# Success Factors

(for W3C activity on SWS)

- Engage enthusiasm from mainstream Web Services community. (Pull not Push)
  - Address **significant** problems faced by or anticipated by WS community.
  - **Proof-of-concept demonstration of utility.**
  - WS Community is requirements driven and will (re)-invent
    - eq. WS-Policy – another resource description framework?
  - May ‘borrow’ from Semantic Web Community without subscribing wholesale.
  
- Maturity:
  - The technology needs to be out of the research phase... beyond the ‘bleeding-edge’.
  - May still be too early to standardise.
  - Need growing consensus on direction – convergent paths.
  
- Accessible
  - Solutions need to be accessible to majority of web service developers.
  - Tooling and understanding.
  
- Build on both WS and SW technologies
  - Invent new things **ONLY** where necessary.

# A Challenge

*To find and 'buy' a book:*

- Discovery with **Google™** Web APIs <http://www.google.com/apis/>
- Add a sprinkle of mediation magic
- 'Negotiate' a price with **amazon.com** [Web Services](#)
- Add it to a shopping cart *resource*



- Extra credit... generalise...

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# What should the W3C Do?

- Assume scale of investment – 1 WG for 18 - 24month.
  - WG focus will be an issue
- Understand relationship with WSDL, WS-CHOR and BPEL.
- We like the OWL-S high-level partitioning into:
  - Profile:
    - Focal point for advertising and discovery.
    - **Should focus more on service (exchange of value) provided and less on interface and interaction.**
    - Our own work models service request/offers as range of acceptable contracts
  - Process Model
    - Focal point for adaptable interaction (SOA or RESTful)
    - **Partial success/failure of composite processes**
    - What a process ‘does’:
      - Names with implicit semantics: Processes, Actions (Communicative and Real World events)
      - Explicit Operational Semantics (IOPEs).
    - **Expression language for pre-conditions and effects.**
  - Grounding
    - **Mediation between business concepts and message content (WSMF, WSMO, WSDL-S?).**
      - Complex content.
    - Action (Communicative Intent) and protocol operations
- WG should focus on Process Modelling and Grounding in OWL and grounding into WSDL.
- Public Domain Ontologies (Concepts and Actions) will also be essential: (Maybe an SW activity)
  - Trading T’s and C’s, Contracts.
  - Shipping, Logistics, Supply Chain, MIT Process Handbook
  - Product Classification.

# Concerns/Questions

- Maturity of State of the Art:
  - Academic and industrial consensus on direction?
  - Overarching conceptual framework?
    - Challenged by somewhat implicit architecture of WS world.
      - WS-Arch did a good job... Traction?
      - What needs to be described using a SWS Description Language?
        - Noun and verb things that are the subjects of SWS description?
  
- Risks of delaying:
  - Overtaken-by-Events: WS community address related problems as they encounter them without regard to SW solutions.
  - Motivated SWS protagonists seek other venues:
  - Window of opportunity?
  
- Risks of being hasty:
  - Head off in the wrong or unclear direction(s)
  - Failure to engage key stakeholders, tending toward irrelevance.



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