

## Web 2.0

CSE 454

## AJAX Companies – Web 2.0??

- **Writely**
  - Collaborative editor
- **gOFFICE**
  - Desktop publishing, wordprocessor
  - Plans for spreadsheet & presentation authoring
- **Numsum**
  - Social spreadsheets
- **Zimbra**
  - Email client (but so is Exchange web client)
- **Zazzle**
  - T-shirt design

## Web 2.0 Themes

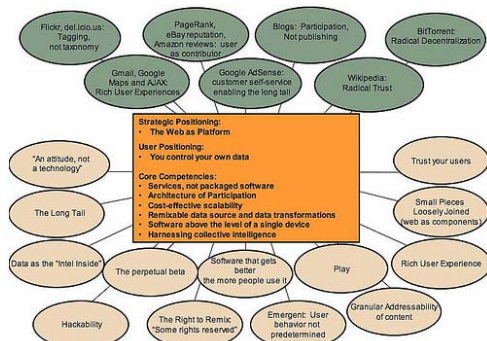
(according to Tim O'Reilly; Chris Alexander)

- The Long Tail
- Data is the Next Intel Inside
- Users Add Value
- Network Effects by Default
- Some Rights Reserved
- The Perpetual Beta
- Cooperate, Don't Control
- Software Above the Level of a Single Device

## Evolution of Web 2.0

Web 1.0	Web 2.0
DoubleClick	--> Google AdSense
Ofoto	--> Flickr
Akamai	--> BitTorrent
mp3.com	--> Napster
Britannica Online	--> Wikipedia
personal websites	--> blogging
evite	--> upcoming.org and EVDB
domain name speculation	--> search engine optimization
page views	--> cost per click
screen scraping	--> web services
publishing	--> participation
content management systems	--> wikis
directories (taxonomy)	--> tagging ("folksonomy")
stickiness	--> syndication

## Web 2.0 Meme Map

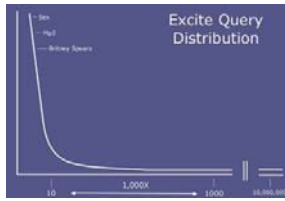


## Web as Platform ?!?

- True for web 1.0 as well as 2.0
- Netscape
- Web services
  - Akami
  - Doubleclick

## Leverage customer self-service to reach edge

- Aim for long tail, not the center



- Doubleclick
  - Over 2000 successful implementations
- Google AdSense
  - X00,000s of advertisers
- Ebay, Napster
- Akamai vs. BitTorrent

## Principle: network effects from user contrib

- Service gets better the more people use it
- eBay
- Amazon reviews
- Wikipedia
- Del.icio.us & flicker – ‘folksonomy’
- Cloudmark – collaborative spam filtering
- Viral marketing in general

## Architecture of participation

Ways to build a large database

1. Yahoo:
  - Pay people
2. OpenDirectory:
  - Get volunteers
3. Napster:
  - Side-effect of other actions

## Data is king

- SQL is the new HTML – Varian
  - Most web 2.0 companies are DB/service driven
- Who owns the data
  - Mapquest – early leader, but...
    - Competition licensed same data from NavTeq
  - In contrast:
    - Amazon licensed data from ISBN register RR Bowker
    - But they kept improving it: submissions, reviews, ...
      - Embrace & extend!

## Owning classes of core data

- Identity
  - Paypal, Amazon 1-click, Google cell-phone/gmail
  - Sxip.com – federated identity “Identity 2.0”
- Product identifiers
  - Amazon’s ASIN
- Calendaring
  - Eventful.com – Largest shared calendar
    - Wiki-style & with tagging
- Location

The screenshot shows the Eventful.com website interface. At the top, there's a navigation bar with "eventful" logo and "Beta" tag. Below that, there's a search bar and navigation tabs for "events", "venues", "calendars", "lovers", and "groups". The main content area displays a list of football events with columns for Date, Event, Venue, and When. The events listed include "Gridiron Classic Football Championships" and "Seattle Seahawks vs Indianapolis Colts".

Date	Event	Venue	When
12/3/05 10 PM	Gridiron Classic Football Championships	Tacoma Dome Tacoma, WA	Future (0)
12/2/05 4 PM	Gridiron Classic Football Championships	Tacoma Dome Tacoma, WA	January (0)
12/3/05 All day	Gridiron Classic Football Championships-2 Day Pass	Tacoma Dome Tacoma, WA	December (0)
4/29/06 7 PM	Supercross	Qwest Field (Seattle Seahawks Stadium) (Football) Seattle, WA	Next week (0)
12/24/05 1:15 PM	Seattle Seahawks vs Indianapolis Colts	Qwest Field (Seattle Seahawks Stadium) (Football) Seattle, WA	This week (4)

## Perpetual Beta – end of software release cycle

- Operations must be a core competency
- Users as co-developers
  - Real-time monitoring & datamining
  - User testing
- Flickr – new builds every 30 minutes ?!

## Cooperate, Don't Control

- The Past
  - Microsoft: proprietary APIs
  - Netscape & MSFT: incompatible HTML tags
- The Future ?
  - Mashups: Google maps & {craigslist, burglaries...}
  - RSS & REST encourage syndication
  - Design for hackability
  - Creative commons: "some rights reserved"

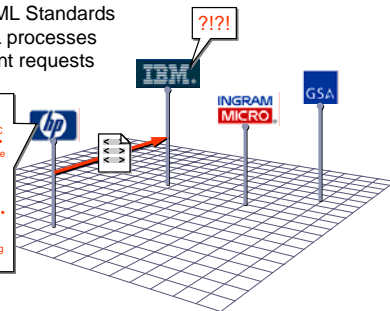
## Software above the level of one device

- Success Stories
  - iTunes / iPod
  - TiVo
- The Future
  - Phones & cars report data (not just consume)
    - Real-time traffic monitoring
    - Flash mobs
    - Citizen journalism
    - (Harrassment)

## Web Services: Vision Vs. Reality

- Complex XML Standards
- Static BPEL processes
- Point-to-point requests

WS-FM • WS-BPEL • WS-Security • WS-I • WS-AT • WS-Trust • WS-CTX • WS-C • WS-Inspection • WS-CDL • WS-Eventing • WS-Resource • WS-SCL • WS-RM • WS-CAF • WS-CF • WS-Policy • WS-ME • WS-Reliability • WS-Discovery • WS-Enumeration • WS-Transfer • WS-Federation • WS-Coordination • WS-Notification • WS-Addressing • WS-Transaction ...



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## Lightweight programming models

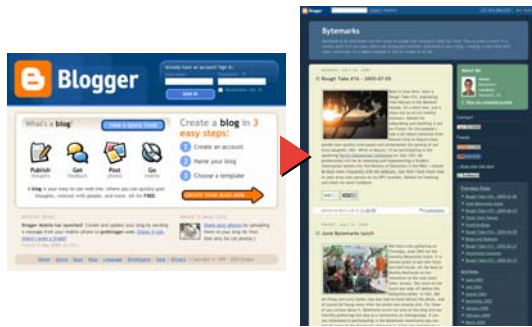
- Web Services too heavy
- Amazon web services
  - SOAP
    - Used by ToyRUs & big vendors
  - XML over HTTP using lightweight REST
    - Used by other 95%
- Loosely coupled systems
- Syndication, not coordination
- Design for 'hackability' – mashups
  - Low barriers to reuse: RSS, AJAX, ... "some rights..."

## Web 2.0 Themes (according to Tenenbaum)

- Participatory (P2P)
  - Blogs, wikis, social networking, RSS feeds
- Semantic
  - Tags, microformats, semantic web, vertical search
- Real time
  - Instant messaging, events (publish/subscribe)
- Pervasive
  - Billions of edge devices (gizmos) with substantial computing and broadband access – phones, cars, RFID readers...
- Community
  - Simplicity, Rapidity, Mass Collaboration, Empowerment

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## Participatory: Blogs



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## >12,000,000 Blogs



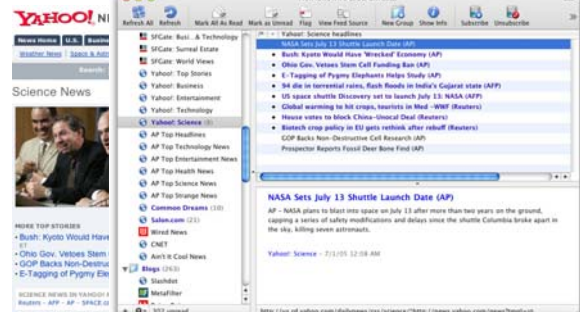
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## Really Simple Syndication (RSS)



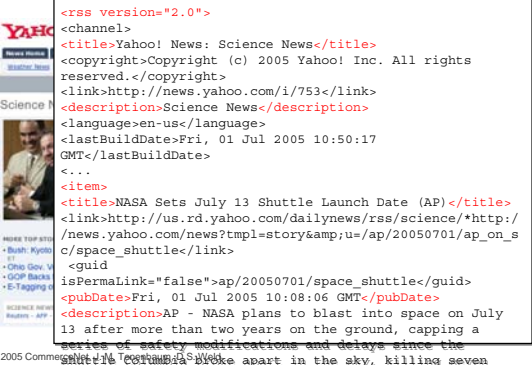
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## Really Simple Syndication (RSS)



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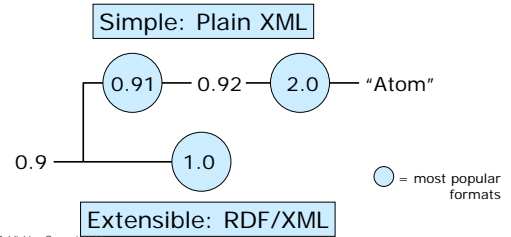
## Really Simple Syndication (RSS)



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## Different RSS Versions

- Originally for news
- Now...



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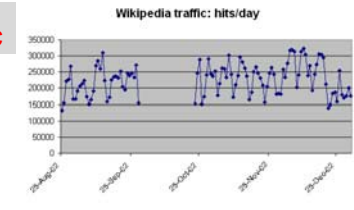
## Wikipedia, The Free Encyclopedia

- 616,000 articles in English
- 1.8 million pages with ~10 edits each
- 314,293 registered users
- 4,700 new articles daily



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## Wikipedia Traffic



- 2<sup>nd</sup> most popular reference site [HitWise]
  - May '05 (up from 13<sup>th</sup> Jan '04)
- 1<sup>st</sup> in education / reference [Nielson Netratings]
  - 289% annual growth in traffic
  - 12.8 M unique visitors [Sept '05]
  - vs. 99.2 M for Yahoo!

## Semantic: Tags

- A different way of organizing knowledge
  - Personal labels
  - Flat folksonomies v. hierarchical ontologies
  - Refined through mass collaboration

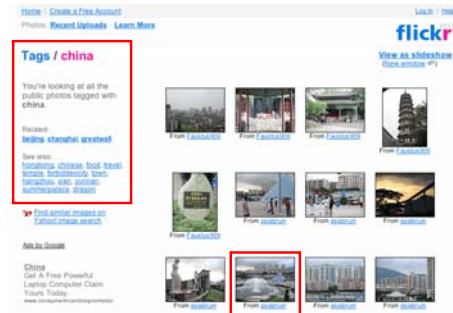


Tags for this photo:

china fountain skyscrapers  
shenzhen pyramid park  
buildings pool light rail  
urban water development

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## Tags: Flickr



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## Tags: del.icio.us



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## Tags: del.icio.us



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## Microformats.org

The screenshot shows the Microformats.org homepage. At the top, there are navigation links: 'microformats', 'blog', 'wiki', 'code', 'discuss', and 'about'. Below this is the 'About microformats' section, which includes a diagram illustrating how microformats are built upon existing standards like RDF, XML, and HTML. A list of 'Overview of microformats' includes: People and Organizations (hCard), Calendars and Events (iCalendar), Opinions, Ratings and Reviews (vCard, hReview), Social Networks (hXFN), Licenses (hLicense), News (hNews), Tags, Keywords, Categories (hTag), Lists and Outlines (hList), and more. There is also a section for 'Upcoming events' and a 'Subscribe' link.

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## Design Principles

- Solve a specific problem
- Start as simply as possible, and evolve
- Humans first and machines second
- Reuse existing widely adopted standards
- Modular and embeddable

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## Microformat Example: hCalendar (Events)

```

<span class="event">
<a class="url" href="events?post=2005/07/20h_aaai05.html">
<span class="summary">The 20th National Conference on Artificial Intelligence</span>
<abbr class="dtstart" title="20050709">July 9, 2005</abbr>
<span class="description">The Twentieth National Conference on Artificial Intelligence (AAAI-05) and the Seventeenth Innovative Applications of Artificial Intelligence Conference (IAAI-05) will be held July 9-13, 2005 in Pittsburgh, Pennsylvania. The IAAI Conference maintains its own conference site...</span>
</a>
</span>
    
```

The screenshot shows a calendar interface with a list of events. A red box highlights an event entry for 'July 9 2005' which matches the microformat example above. Red arrows point from the code block to the corresponding parts of the calendar entry.

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<http://microformats.org/wiki/hcalendar>

## AI Opportunity: Semantic Highlighter

The screenshot shows a semantic highlighter interface displaying a profile for 'Dr. Marty Tenenbaum'. The profile is structured into sections: 'Additional Current Engagements', 'Past Employment History', and 'Education'. Red boxes highlight specific parts of the profile, and red arrows point from the code block in the previous slide to these highlighted areas, demonstrating how the semantic highlighter interprets the microformat data.

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## Datamining + ontology => Structured data

Exploit models of the domain and user to

- Mine the deep web
- Organize the results
- Draw inferences

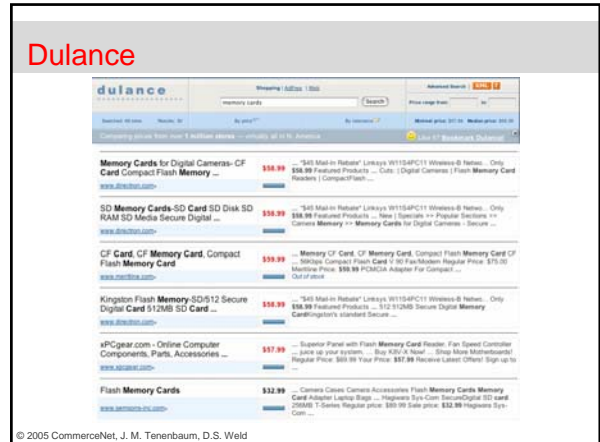
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The screenshot shows a zoominfo profile for 'Dr. Daniel S. Weld'. The profile is highly structured and organized into sections: 'Other Sites', 'Additional Current Engagements', 'Past Employment History', and 'Education'. This structured data is the result of datamining and ontology-based processing of web information.

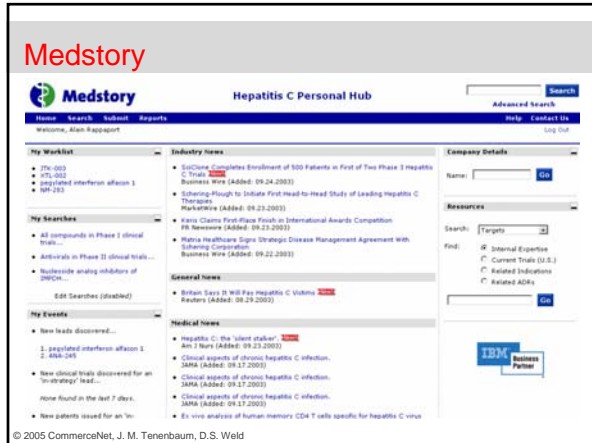
## Dulance (& Froogle)



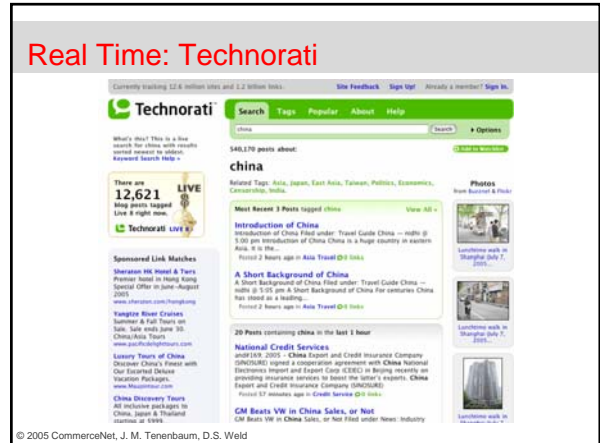
## Dulance



## Medstory



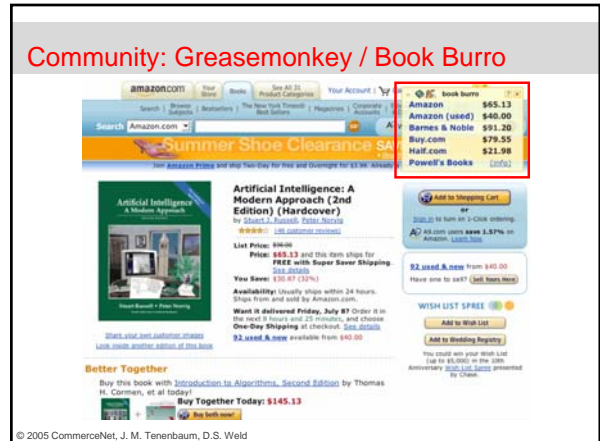
## Real Time: Technorati



## PubSub.com



## Community: Greasemonkey / Book Burro





## Greasemonkey: Greasemap

Map of Meredy Park area with a red pin.

**aaai contact form**

How to Contact AAAI

AAAI is located in the state of California (USA), in the Pacific time zone. The association is happy to answer any inquiries about its programs, publications, and policies. To contact us in writing, please use the following address:

American Association for Artificial Intelligence  
440 Ringier Drive  
Menlo Park, California 94025-3442 USA  
Telephone: (650) 329-3152  
Fax: (650) 329-4487  
URL: <http://www.aaai.org>

Please do not send unsolicited sales communications ("junk e-mails") or press releases by fax.

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## Personal Agents

**Automator**

**Craigslist Data Source**

Query: 2br rent apartment palo alto  
Check every: two hours  
Output: RSS

**Microformat Transformation**

Format: hCard  
Script: If within 2 miles of CommerceNet then set priority to medium  
If rent < \$1500 then set priority to high

**Google Maps Transformation**

**Notify**

Script: If priority is high then page (650) 555-5555  
If priority is medium then email [gm@commerce.net](mailto:gm@commerce.net), with subject "Potential Housing Found"

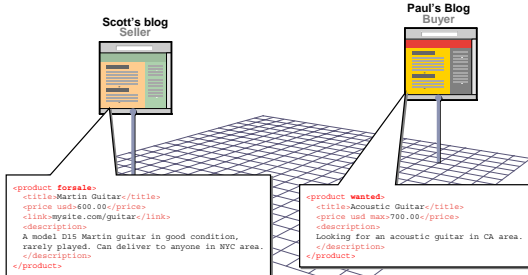
**Email**

From: Automator Service  
To: Marty Tenenbaum  
Subject: Potential Housing Found

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## Future: zBay: Blowing Up The Center

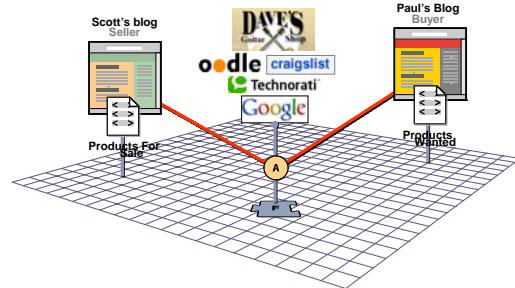
Microformats describe products wanted and for sale.



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## Future: zBay

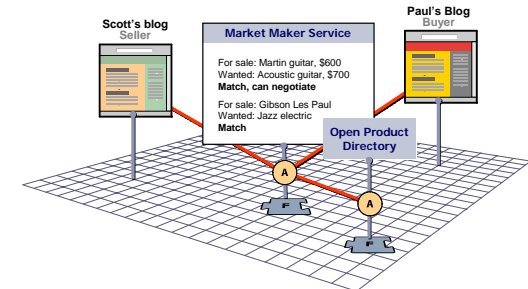
This data is spidered by and submitted to aggregators.



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## Future: zBay

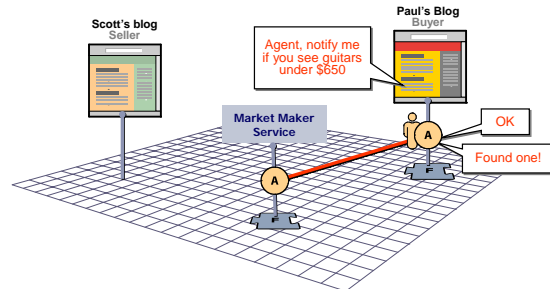
Market maker services match buy and sell requests.



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## Future: zBay

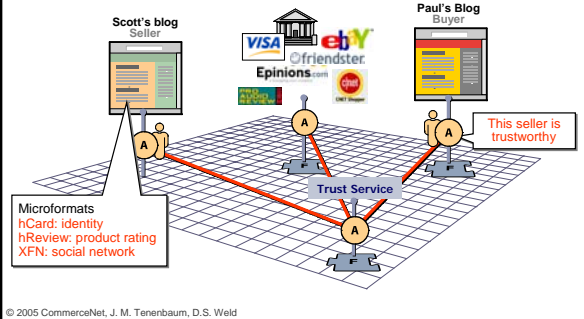
Personal agents watch the market and take action for users.



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## Future: zBay

Trust services make use of reputations and reviews.



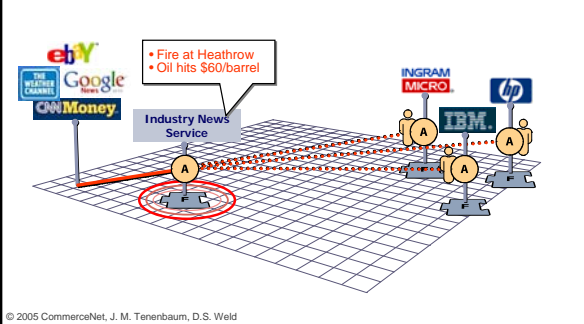
## Semantic Web Revisted

### Electronics Supply Chain

- It's about time
    - 90-180 day product cycles
    - Forecasting accuracy ~50%
  - Instantaneous response to demand and supply signals
    - Stores, emarketplaces, suppliers, distributors, shippers...
    - News feeds, blogs
    - Real time "Edge sensors" (e.g., RFID)
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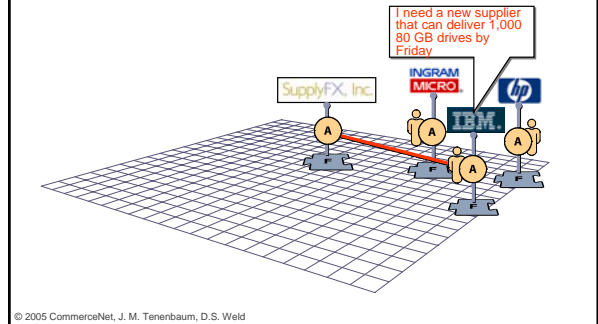
## Electronics Industry Supply Chain

Sense Plan Act Learn



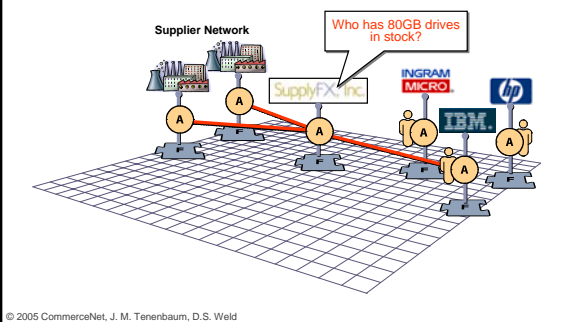
## Electronics Industry Supply Chain

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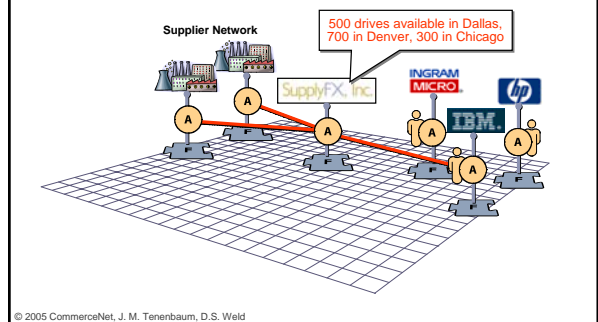
## Electronics Industry Supply Chain

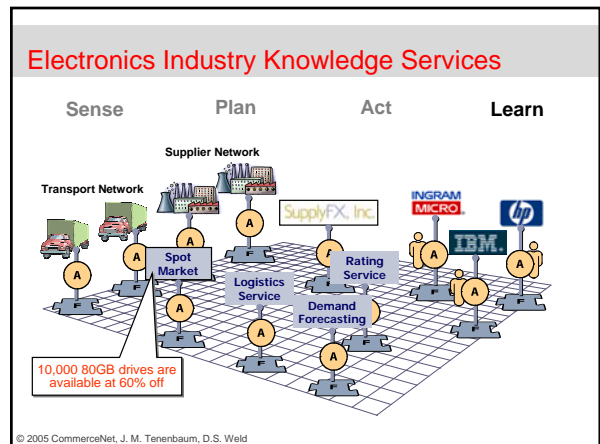
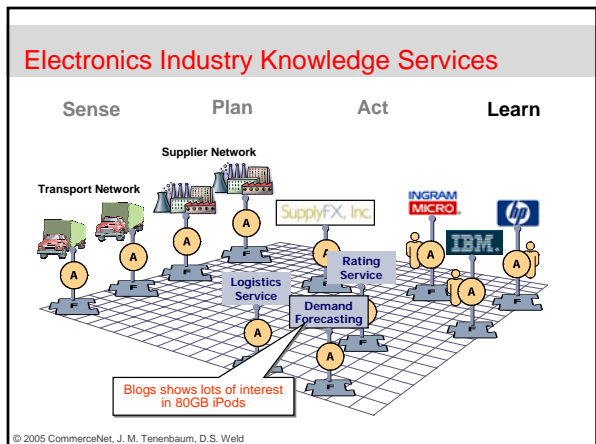
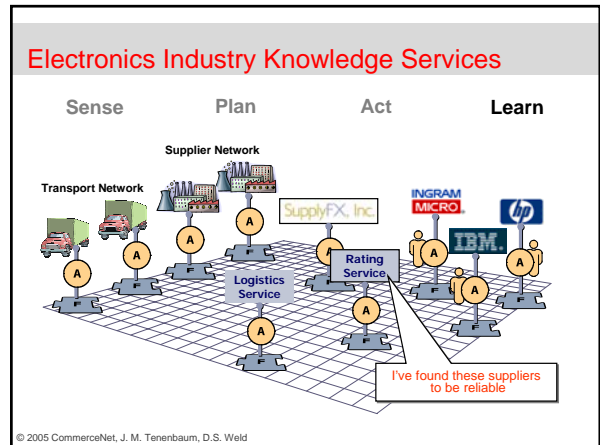
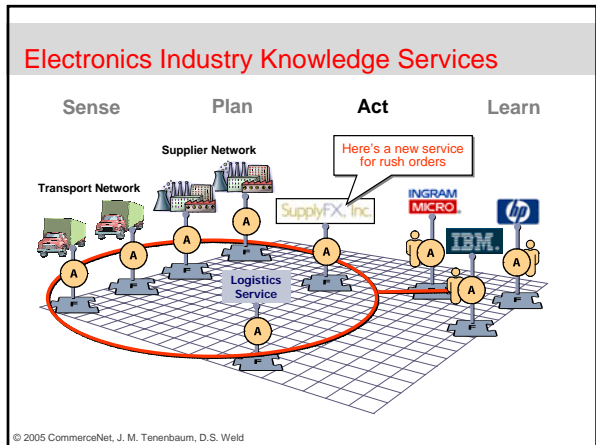
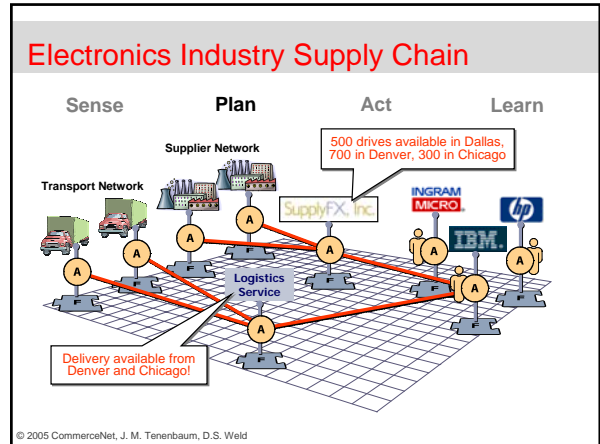
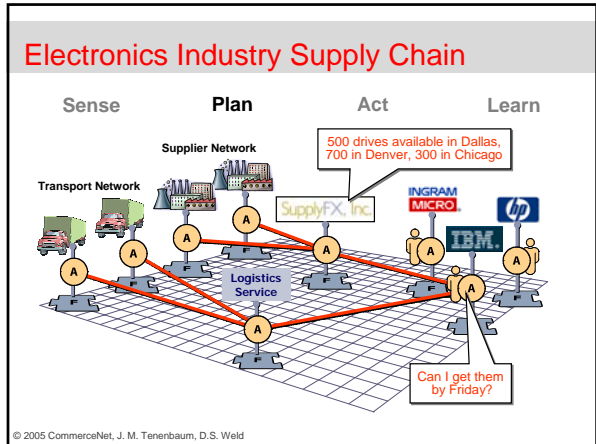
Sense Plan Act Learn



## Electronics Industry Supply Chain

Sense Plan Act Learn





## Implications

- Business process transformation
- Disaggregate service chains and re-aggregate around information chains
  - Improve business agility, streamline operations, and generate new revenue
- New business models
  - Blow up center, reverse the arrows (e.g., zBay)
  - Everyone an Amazon, eBay, CBS...
  - Reselling K processes on eBay

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## Semantic Web 2.0 Wiki

- Slides
- People, projects, papers, companies...
- Public discussion forum
- Open source research proposals
- Open source code libraries

[www.commerce.net/semweb2](http://www.commerce.net/semweb2)

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