A Travel Strategy for Semantic Technology
Introduction

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- Robert Kost – THEMATIX
Agenda

- How Avis got Semantic
- The Travel Industry & Its Challenges
- How Semantic Technology can address the Challenges
- Specific Use Cases
- Future Potentials
- Close
How Avis got Semantic
How Avis got Semantic

- Customers tell us about the Opportunities
  - “Where can I rent a Camaro?”
  - “Can I rent a car with an MP3 jack?”
  - “What do you have that fits a big man on a tight budget?”
  - “Can I add a friend to the reservation?”
  - “You’re sold out; now what?”

- We are looking at a tech horizon
  - mobile, location, mashups, distributed presences, semantics ...
How Avis Got Semantic, con’t

- What We Did
  - Establish a ‘proprietary standard” – an early travel (car rental) gene
    - Create an ontology against a number of definite use cases
    - Begin to execute the use cases
    - But a proprietary-standard does not scale
  - Help build an industry standard – clone and mutate the gene
    - Travel is a deeply interrelated industry value chain
    - Travel distribution is highly automated and realtime system: arguably, the largest eCommerce category on the internet
    - The Industry need standards for interoperability
      - The Open Travel Alliance: XML web services standards
      - Others: ATPCO, IATA, Open Axis...
OpenTravel Alliance

- Ontology project, driven by interest in
  - better governance,
  - better search optimization and leverage,
  - better marketing, merchandising,
  - CRM and analytics
  - Improved intra-domain and cross-domain search functionality

- Use OTA to drive adoption of car rental ontology, and thereafter other travel ontologies
The Travel Industry & Its Challenges
Travel Distribution

Travelers

unmanaged

managed

Agencies

brick & mortar

online

GDS

 Suppliers

Airlines, Hotels, Cars

Avis Budget Group

Travelport

Sabre

Amadeus

Galileo

Worldspan

Orbitz

Travelocity

Expedia

GetThere

Resx

Kayak
Travel Industry Challenges

Mediation & Commoditization

- The need for
  - integration
  - uniformity
  - homogenization

versus

- The need for
  - brand differentiation
  - product differentiation
  - customer relationship and “ownership”
  - preserving margins
Challenges Specific to Car Rental

- Purely transactional interactions
  - ‘The best you can say is: it was uneventful’
- Competitive differentiation
  - In product, in service
- Lack of granular marketing
  - Inability to search & book specific product
- “tail on the dog”
  - After air, hotel
Overcoming the Challenges

- Better Industry Partner Integration
  - joint, coordinated, intelligent customer servicing
- Better Product / Service Differentiation
  - opening “facets” of the product
- Better Merchandising & Distribution
  - search engine & other relevant forums
- Finding rather than searching
  - goal-base, requirements-based, profile-based presentation
Why turn to Semantics?

- **Flexibility**
  - in classification of assets and features
  - in interoperability between partners

- **Power**
  - meaning-based search as opposed to static workflow; meet customer intent, rather than merely criteria

- **Association**
  - unify and associate disparate data, such as mashups, customer data, fleet data
  - federate information from across heterogeneous sources
  - sell ancillary services based on knowledge of core purchase

- **Marketing and Merchandising**
  - use search engines as a reservation “front door”
  - present product based on what we know about the customer
  - turn the rental “incident” into an “experience”
The Avis Ontology
Why a Car Rental Ontology?

- Top-line revenue
  - marketing driven requirements
- Industry leadership and standardization
  - OpenTravel Alliance responsible for SOA standards; ontology “a natural”
  - Expansion to air, hotel, rail and other suppliers possible and desirable, driven by interoperability concerns
- Occurring in context of the growing importance of data strategy
The ontology intends to model the Avis line of business, and from the perspective of sales and marketing, but not from the perspective of operations. Thus, functions that are not of interest to the consumer, sales staff or marketing staff are not included in the model.
## Preliminary Ontology Architecture

<table>
<thead>
<tr>
<th>Avis Specific Terminology</th>
<th>Avis Vehicle Description</th>
<th>Avis Vehicle Classification</th>
<th>Avis Eligibility Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avis Wizard Profile</td>
<td>Avis Facilities</td>
<td>Avis Contracts &amp; Offers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ACRISS / OTA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vehicle Codes</td>
<td></td>
</tr>
</tbody>
</table>

### Common Domain Terminology

<table>
<thead>
<tr>
<th>General Renter Profile</th>
<th>Rental Car Facilities</th>
<th>Rental Contracts &amp; Offers</th>
<th>Rental Eligibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agents/People</td>
<td>Facilities</td>
<td>Contracts &amp; Offers</td>
<td>Basic CRM</td>
</tr>
<tr>
<td>Language</td>
<td>Countries</td>
<td>Geospatial &amp; Addressing</td>
<td>Time &amp; UoM</td>
</tr>
</tbody>
</table>

### Business Capability Concepts

<table>
<thead>
<tr>
<th>Metadata</th>
<th>Basic Terminology &amp; Ontology Metadata</th>
</tr>
</thead>
</table>

### Standard Utility Concepts

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</table>
What is the Ontology Ultimately Good For?

- Responding to customers the way a person might
  - Natural language with semantic interpretation
- Making differential offers
  - Determining or suggesting customer rates, cars
- Inferring and responding to customer intent
  - “are you in town for ...?” “may we suggest ...”
- Providing powerful business analytics
  - Heterogeneous facts in unique, *ad hoc* combination
How might Semantic Technologies be used?
Sample Semantically-Enhanced Approaches

- Search Engines
- Smart Search
- Synthetic Merchandising
- Ancillary / Cross-sell
Search Engines
Search Enhancement

Search engines as a “front door”

Enrich search results, adding ratings, video, prices, avails, amenities, locality etc.

Search Enhancement

dramatically increase relevance by inclusion of more meaningful, synonymic tags
Search Engine Relevance

- Two primary factors in Search Engine Indexing
  - Relevance – how many relevant searches will match your page
  - Page ranking – where in the ranking order does your page appear
- If your page does not appear in the results of a relevant search, the page rank does not matter
- Page ranking scores have little to do with the language and meaning content of the page
- Conventional SEO is needed in addition to increased relevance
RENTAL: Leveraging OTA and Ontology

Products?
Prices?

Products!
Prices?
Selling Cars?

Products!
Prices!
Renting Cars!

Car Rentals
{Subcompact, from $20.95/day},
{Compact, from $24.95/day},
{Performance, from $44.95/day},

Google
bing
Yahoo!

AVIS
**Semantic SEO**

- Invisible HTML markup containing structured data (typically as non-rendered attributes on `<div>` and `<span>` tags).
- Who defines it?
  - Yahoo. structured data supported (RDFa/microformats per Search Monkey / FOAF / Good Relations) “Evolving toward open standards... collaborating with Bing on crawling / indexing – enriching results using structured data they have... creating structured formatting for all Yahoo content – "Web of Objects" – entity extraction out of unstructured content”
  - Bing. No formal announcement yet, but clear semantics initiatives
  - W3C – RDFa (XHTML embedding of RDF), HTML5 Microdata
  - Microformats.org
  - Facebook. Open Graph (“Like” markup – shared within Facebook)
- Two forms possible:
  - Use of EXISTING taxonomies (non-Rental)
  - Use of ONTOLOGY (Rental)
Smart Search
What we’d like to see

• Search of Avis produces user intent, leading directly to a booking.

• For Example:
  • Search term “performance cars” maps to ontology class PerformanceCars.
  • PerformanceCars is defined by factors including gross horsepower and power to weight ratio
  • PerformanceCars class contains many car classes: Camaro SS, Cadillac CTS, Ford Mustang, BMW 328i
  • Return list of PerformanceCars car classes available at Avis
  • If search terms do not map to ontology, default to existing text search
Text Search on Avis.com

Search

Please enter a question or a keyword

performance cars

Search Results

1. View our Car Selection
   Check out our fleet in the Car Guide or view our Cool Car Collection. Car types vary by location. Use our online Reservation Engine to see the cars available at your desired location.

2. Avis Rent a Car - Avis Mission & Values
   Read what Avis is all about! We will treat each person with whom we work with respect, professionalism and dignity. We will communicate expectations to employees, and provide honest and timely feedback on performance. We will embrace a diversity of ideas, cultures, ethnicities and backgrounds to enhance our prestige and value to customers.

3. Avis Rent a Car - Affiliate Program Benefits
   Share in Our Success! Once you’re an active Avis Affiliate, you’ll enjoy easy access to a free Online Affiliate Toolbox with all the information you need to be successful. Through the online Toolbox, you can choose the offers and banners that will meet your customers’ needs, track their performance and manage their account information.

4. Camaro
   Language Preference Grab the wheel and prepare to be WOWED as Camaro lives up to its reputation as a modern performance car. You’ll turn heads when you take it on the road and map out your own new adventures. And with impressive fuel economy, it’s a practical luxury that you deserve.

5. The 2011 Chevrolet Cruze: Exclusively at Avis
   Rent a 2011 Chevrolet Cruze, the car that brings midsize car presence to the compact car segment. Cruze challenges conventional compact wisdom with one simple word: more. Its cavernous, quiet interior and beautifully sculpted exterior feel like luxury. Cruze is filled with performance, safety and technology features you won’t believe come in a compact.

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Semantic aided search results
CREATE NEW PICTURE
Robert Kost, 5/10/2011
How Smart Search Works

Language Processing

Meaning Processing

Avis IT Services

car rental 6
persons suitcases
renting car six
people luggage

[car rental] [6
persons] [luggage]

[full size SUV rental]

synonyms
suffixes
spelling variants
syntactic chunks

dictionary

ontology

categories
meaning translation
services translation

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Synthetic Merchandising
How can it be used? Merchandising

“Comfort-Oriented” Flight

Attribute 1
Attribute 2
Leg Room
Attribute 4
Attribute 5
Attribute 5
On-Off Access
Attribute 7
Attribute 8
Attribute 9
Media Options
Attribute 11
Attribute 12
Media Options
Attribute 14
Attribute 15
Time of Day
Attribute 17
Attribute 18
Distance to Gate
Attribute 20
Attribute 21
Flight Characteristics
Attribute N...

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How can it be used?
Merchandising Across Partners

- “Romantic”
  - Cross-aisle seats
  - 5 star hotel
  - Convertible car
- “Infant / toddler”
  - Pre-boarding to back of plane
  - Car seat rental
  - suite
- “Disability / Senior”
  - Jetway?
  - ADA Bathroom
  - Scooter Rentals
Ancillary / Cross-Sell
Delivering continuously along a value chain

“Business Trip w/ Family”
• 2 adults
• 2 children < 10 yrs
• 1st class
• Member OnePass + Avis Premier
• 3rd time to Orlando
• Residence Zip Code 10011
• 3 bags
Location / Event Services
yet another hypothetical case

- Potential customer is heading to some really popular event, the Masters, and there are no cars available in Atlanta by the time they check.
- If they already have a flight,
  - expand the vicinity search to include city locations within a reasonable taxi ride from the airport.
- If they haven’t made flight plans yet, or if there are no city locations with vehicles available,
  - check other airports within a 2-3 hour drive of the destination, to see if there are vehicles at any of them (this would require knowing the potential starting airport(s), to check flight availability in addition to vehicle availability).
More use cases ...

- Data mash-ups providing valuable customer packages or advisories
- Social media applications that “wrap” conventional bookings in different workflows
- Itinerary advisors, accommodating changes, warning of events, providing alternatives
- Smart Itineraries (TripIt?)
- ...

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Vision

- Travel agents to return!
  - But not the human kind
  - Standardized, shared meaning facilitates common operations to be performed across many suppliers
  - Fulfilling on the SOA vision
- The Customer Experience is both real and virtual
  - Use semantics to provide services not heretofore possible
  - Provide tools for finding, rather than searching
  - The customer is a search term
  - Reach through all available media
- Distributed customer entry points for bookings
total rewrite

Robert Kost, 5/10/2011
Conclusions
Some conclusions

- Promising opportunities
  - OpenTravel Alliance has commissioned a project to use a car ontology in conjunction with its new messaging specifications
  - Promising returns from an “Orlando” project
  - ...
- But too early to tell
  - Invite us back next year
Thank you
Tell me what you know about these vehicles and related offers

Query

Classifier

Ontology

Candidate results

Filtered / adjusted results

Concepts, related statements, related terms

Rule-engine / other algorithms

ontology-related processing
Potential Approaches

- “Pure” marketing approaches limited
  - Distribution limits on availability, price, options – ‘cutting off one’s nose ... ‘

- Change the direct experience
  - This is where technology (and especially semantics) can help
  - The customer IS the search