Semantic Metadata, Auto-classification and Taxonomies
How and why your organization should take the leap

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The Global Leader in Managed Metadata Solutions

- Company founded in 2002
  - Product launched in 2003
  - Focus on management of structured and unstructured information

- Technology Platform
  - Delivered as a web service
  - Automatic concept identification, content tagging, auto-classification, taxonomy management
  - Only statistical vendor that can extract conceptual metadata


- Authority to Operate enterprise wide US Air Force and enterprise wide NETCON US Army

- Locations: US, UK, and South Africa

- Client base: Fortune 500/1000 organizations

- Microsoft Business-Critical SharePoint program partner, Gold Certification in Application Development

- Smart Content Framework™ for Information Governance comprising
  - Five Building Blocks for success
  - Product Platforms: conceptClassifier for SharePoint, conceptClassifier for Office 365, conceptClassifier, and Concept Searching Technology

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Metadata, Auto-classification, and Taxonomies
Types of Classification Metadata

**Intrinsic** – information that can be extracted directly from an object (file name, size)

**Administrative/Management** – information used to manage the document (author, date created, date to be reviewed)

**Descriptive** – information that describes the object (title, subject, audience)

**Semantic** – ability to extract concepts from within content and generate the metadata (intelligent metadata)
Why do you care?

- Without effective governance, most technology focused metadata projects will fail (*Forrester Research*)
- Less than 50% of content is correctly indexed, meta tagged, or efficiently searchable
- Unstructured data and metadata are increasing at an average annual growth rate of 62%
- Corporations will be responsible for the security, privacy, reliability, and compliance of 85% of that information (*IDC 2010 Digital Universe Study*)
- 67% of data loss in records management is due to end user error (*Prism International*)
- 70% of data breaches are due to end user error (*Ponemon Institute*)
The Challenges of Content Overload
- 80% of enterprise data is unstructured (IDC)
- 60% of documents are obsolete (eLaw)
- 50% of documents are duplicates (Equivio)

The Benefits of Automatic Semantic Metadata Generation
- Elimination of costs and errors associated with end user tagging
- Identification and protection of secure content assets from unauthorized access and portability in accordance with compliance procedures
- Automatic in-place identification and tagging of documents of record
- Normalization of content across functional and geographical boundaries
- Integration with the enterprise search
- Ability to apply policy consistently across diverse repositories
### Why is metadata so hard to get right?

A manual metadata approach will fail 95%+ of the time

<table>
<thead>
<tr>
<th>Issue</th>
<th>Organizational Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inconsistent</td>
<td>Less than 50% of content is correctly indexed, meta-tagged or efficiently searchable rendering it unusable to the organization ( (IDC) )</td>
</tr>
<tr>
<td>Subjective</td>
<td>Highly trained information specialists will agree on meta tags between 33%-50% of the time ( (C. \ Cleverdon) )</td>
</tr>
<tr>
<td>Cumbersome - expensive</td>
<td>Average cost of manually tagging one item runs from $4 - $7 per document and does not factor in the accuracy of the meta tags nor the repercussions from mistagged content ( (Hoovers) )</td>
</tr>
<tr>
<td>Malicious compliance</td>
<td>End users select first value in list ( (Perspectives on Metadata, Sarah Courier) )</td>
</tr>
<tr>
<td>No perceived value for end user</td>
<td>What’s in it for me? End user creates document, does not see value for organization nor risks associated with litigation and non-conformance to policies</td>
</tr>
<tr>
<td>What have you seen</td>
<td>Metadata will continue to be a problem due to inconsistent human behavior</td>
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Concept Searching has a unique approach to ensure success

- Concept Searching’s unique statistical concept identification underpins all technologies
- Multi-word suggestion is explicitly more valuable than single term suggestion algorithms

- **conceptClassifier** for SharePoint will generate *conceptual metadata* by extracting multi-word terms that identify ‘triple heart bypass’ as a concept as opposed to single keywords
- Metadata can be used by any search engine index or any application/process that uses metadata.
OK, we have our metadata, what’s next?

Auto-classification
Automatic Document Classification

- **Supervised** – some external mechanism, such as human feedback, provides information on the correct classification.

- **Unsupervised** – also known as document clustering, where the classification has no reference to external information.

- **Semi-supervised** – where parts of the documents are labeled by an external mechanism and some by human intervention.
Statistical Rules-based Linguistic Machine Learning Semantic Networks

Auto-classification Systems

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Units and categories</th>
<th>Tools</th>
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<tbody>
<tr>
<td>Pragmatics</td>
<td>Discourse type</td>
<td>Emotion analyzers</td>
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<tr>
<td>Discourse theory</td>
<td>Genre</td>
<td>Rhetorical coherency tools</td>
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<tr>
<td>Rhetoric</td>
<td>Speech act category</td>
<td>Named entity recognizers</td>
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<tr>
<td>Speech act theory</td>
<td>Emotion</td>
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<tr>
<td>Semantics</td>
<td>Predicate</td>
<td>Word sense disambiguators</td>
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<td>Logical representation</td>
<td>Semantic role analyzers</td>
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<td>Word sense</td>
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<td>Syntax</td>
<td>Sentence</td>
<td>Syntactic Parsers</td>
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<td>Phrase</td>
<td>Chunks</td>
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<td></td>
<td>Word</td>
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<tr>
<td>Morphology and lexical analysis</td>
<td>Word</td>
<td>Tokenizers</td>
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<tr>
<td></td>
<td>Prefix and suffix</td>
<td>Stemmers</td>
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<td></td>
<td>Grammatical gender</td>
<td>Lemmatizers</td>
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<td>Grammatical number</td>
<td>Part-of-speech taggers</td>
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<td>Conjugation</td>
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<td>Declension</td>
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<td>Phonetics and phonology</td>
<td>Sound</td>
<td>Speech recognition tools</td>
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<td>Phoneeme</td>
<td>Spectrograms/Sonograms</td>
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<td>Syllable</td>
<td>Speech segmentation tools</td>
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<tr>
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<td>Intonational category</td>
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Training Data  

Machine Learning Algorithm  

Feedback  

Test Data  

Hypothesis  

Performance  

Taxonomy Implementation / Engineering

Classification (Subject)  

Rule Definition  

Evidence List  

Combination Logic  

Manual Tagging  

Automatic Tagging  

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Auto-classification Systems – What do they do?

**Document Preparation**
- Split into language blocks (paragraphs, headings), formatting, layout

**Parsing**
- Entity extraction
- NLP: parts of speech, phrases
- Terms, variants

**Weighting**
- Frequency
- Location in text, phrase
- Proximity
- Combination
- Format of text

**Classification**
- If threshold reached
- Can influence search results

Not all classification solutions are created equal!

This is where rules vs statistics come into play…
We still have one more missing piece!

Taxonomies
Types of Taxonomies

List, Picklist, Controlled Vocabulary, Authority Files – list of lead or preferred terms, selected by the end user, may or may not have relationships among the terms, can include a synonym ring

Synonym Lists - the use of synonyms allows one concept to be instantiated as the same as the other, but still allows a term to be preferred over another

Hierarchical – each content item resides in only one category, referred to as a ‘tree’
- Piano
  - Musical Instrument
**Types of Taxonomies**

**Polyhierachical, Faceted, Thesauri** – content items can exist in more than one category, more structured controlled vocabulary, provides information about each term and its relationship to other terms, features of a hierarchical taxonomy plus associative relationships

- Piano
  - Musical Instrument
  - Stringed Instrument
  - Percussion Instrument

**Ontology** – multiple taxonomies with additional relationships added to specify concepts within a domain

Sources: Marlene Rockmore – The Taxonomy Blog, and Heather Hedden, author of ‘The Accidental Taxonomist’
Let’s talk about SharePoint, Office 365, OneDrive, Delve and Information Governance
Why Information Governance in SharePoint and/or Office 365?

- A single semantic framework regardless of where content resides
- Maximizes value of enterprise information assets
- Reduces liabilities surrounding lack of processes
- Provides a way to manage unstructured and semi-structured data in a cloud or hybrid environment
- Reduces organizational risk
- Avoids the cost of non-compliance
- Addresses cyber security and data protection
- Improves decision making and organizational performance

The goal of information governance is to optimize the value of information, while simultaneously minimizing the associated risks and costs.
What is the challenge with SharePoint?

- **Search**: SharePoint 2013 search is much improved in regards to features, but the same old problem of user tagging compromises the quality and relevancy of search results. **85%** of relevant documents are never retrieved in search *(IDC)*

- **Security** at the content level: **83%** of data harm/damage is due to user mistakes and accidents and only **1%** malicious internal user behavior
  - The probability of a material data breach in an organization with **10,000** records is **22%**
  - Average cost to the organization - **$3.3 million** *(Ponemon Institute)*

- **Records Management**: **88%** of organizations are challenged by regulatory change *(Robert Half International)*, less than **50%** of content is correctly indexed, meta tagged, or efficiently searchable *(IDC)*, average cost of manually tagging one record is **$4-$7**

- **Migration**: mass moves impact search, eDiscovery, content management,
  - Duplicates, content that should be archived, and just plain garbage are never addressed, can be a storage issue
What is the challenge with Office 365?

**See Previous Slide**

- **And…**
  - How do you manage security?
    - What is required for applications? Multi-factor authentication, encryption, ‘enterprise ready’?
    - The average organization loads **85.6GB** of high risk applications to the cloud *(Skyhigh Networks)*
  - How do you replicate your business processes in Office 365?
  - How do you integrate with SharePoint applications that are not cloud ready?
  - How do you manage all content and keep it in synch?
  - How do you determine what content goes where?
  - How do you audit for compliance?
  - How do you identify and manage risk?
Office 365 Technology Challenges

- Office 365 limits the type of solutions that can be installed
  - No full trust solutions, sandbox only
  - Reduced SharePoint and Web APIs
Auto-Classification Challenges in Office 365

- The restrictions in Office 365 pose specific challenges to an auto-classification application
  - Metadata updates cannot invoke a system update:
    A problem if you want to update MMP without corrupting the Modified By user and date
  - Term Store APIs are restricted:
    Rename Term and Delete Term are not supported and Term GUIDs cannot be specified
What is the challenge with OneDrive?

What are your users doing, *despite availability of enterprise tools*?

- **89%** of 5,187 full-time employees use consumer file sync and storage tools at work, despite the security risks, **25%** use three or more consumer/commercial products to get work done

- **44%** rely on email and memory sticks (*Ovum*)

- Your content is only as safe as your least common denominator user
  - Do you know what is being saved to OneDrive?

- What is your tolerance for risk or loss of confidential information?

- In a BYOD world do you know what OneDrive is being synched to?
  - How do you handle a lost device that is synched to OneDrive?

- Several organizations are turning off OneDrive for Business because there is no way to guarantee what is being posted there is compliant with governance, enterprise policies, and directives
  - Users may be unaware their My Documents are being auto synched to OneDrive
  - Is this the right approach?

*So, What’s in your OneDrive?*
What is the Risk with SharePoint, Office 365, and OneDrive?

• Loss of confidential information
  • Proposals
  • Pricing information
  • Financial forecasts
  • Negative reports
  • Security information and protocols
  • Trade secrets
• Legal liability
  • PII/PIA/HIPAA
  • Customer/Confidential information
• Corporate Reputation
  • Can you survive a loss of consumer faith? Can your boss?

**PHYSICAL TRAINING FATALITIES**

- Chart showing physical training fatalities from 1996 to 2006.
  - Number of fatalities per year for each category.
  - Comparison between fiscal years 2005 and 2006.
  - Class A mishap numbers and mishap rates for fiscal years 2005 and 2006.
  - 10-year average mishap rates and mishap numbers.

**Class A Mishaps/Mishap Rate (FY06 vs. FY05):**
- Fiscal Year 2006:
  - 8 mishaps
  - 2.06 mishap rate
- Fiscal Year 2005:
  - 8 mishaps
  - 2.01 mishap rate

**10-Year Average (FY96-05):**
- Mishap numbers:
  - 5.1
- Mishap rates:
  - 1.24
Isn’t OOTB good enough?

- Short answer, **No**
  - You don’t know what is being synched or loaded to OneDrive, in fact, your users may not realize what is being synched, so when they save that super secret quarterly earnings report to their My Documents…
  - Little integration between on-premise and hybrid environments
  - Cloud is still risky business, unless managed in accordance with enterprise policy
  - Lack of controls to prevent use and access to ‘non-approved’ cloud services and applications
  - MSFT has a solution that will notify you that something is amiss, but…
    - That might work if you only have 20, 30, maybe 100 personnel and OneDrives but can you realistically monitor 90,000 or more in that fashion?
  - The solution must include additional automation and options such as DRM

**The solution must intercept content before it is available in OneDrive**
What about Microsoft’s Recent DLP Announcement?

- Only addresses the cloud
  - Not hybrid
  - Not on-premise
  - The average number of cloud services used by an enterprise came in at **738, 10 times more** than what IT typically expects from its employees, …and you are going to hire how many more people?

- Does not really do much more than a well crafted search query
  - Do you have the time to go look at 90,000 OneDrives and ensure Office 365 is not the repository for confidential information? …and you are going to hire how many more people?

- Does not stop unauthorized cloud services from being placed in Office 365 or content in OneDrive which means it is available until an admin goes in and identifies and removes it, that might be hours, days, or never
  - So, if you were a large pharma company and FDA wrote a nasty report on your new miracle drug, that report might be in the wild for hours, days or even a week before it is secured. Is that a risk you can live with?
What about Microsoft’s Delve?

- We all know what Delve is – right?
  - Search and discovery tool that automatically delivers the most interesting, most useful and most relevant information from across all of Office 365 using machine learning and artificial intelligence
  - Delve will ‘guess’ what you are looking for based on your activities
  - Office Graph is the search engine technology using artificial intelligence, based on Yammer’s Enterprise Graph technology, developed by the previous FAST group located in Oslo
  - Currently supports Exchange, Yammer, OneDrive for Business, SharePoint Online
To use or not?

- Only addresses the cloud
  - Not hybrid - Not on premise
- Works best across distributed teams and workgroups
- Personal tool, dependent on end user adoption
  - Enforcement issues
- Caveat: If you don't allow access to the Office Graph, you also disable solutions that are built on top of it, such as Delve, and you remove Delve from the Office 365 global navigation
- Does this replace Office 365 search?
  - No, augments it
- Is SharePoint Integration planned?
  - No
- Security concerns
  - Whistle blower protection
  - Personal security violations
- Accuracy? Artificial Intelligence is great but…
Augment the tools Microsoft gives you… Why?

- An added value third party application able to generate and use intelligent metadata can deliver an organization significant benefits in terms of productivity, governance and compliance, across SharePoint, Office 365, and OneDrive.

- What makes this different?
  - Intelligence to identify and trap content as its migrated from file shares during the onboarding process.
  - Automation to move the content to a secure location for evaluation.
  - The option to invoke and kick off Information Rights Management.
  - The option and ability to expand this to include Documents of Record.
  - Aligns with Governance policies across the organization, file shares, SharePoint on-premise and SharePoint Online.

Most important, intercept and secure the content before it becomes available in OneDrive, and identify unauthorized cloud services or application that has been loaded into Office 365.
What can an Enterprise Metadata Enabled Approach Achieve?

• Immediate
  • Supports and facilitates development of your enterprise metadata and content management strategy
  • Improves search and findability
  • Intelligent content migration into O365/One Drive
  • Auto-classifies all content, regardless of whether IT is aware of its existence
  • Elimination of end user tagging
  • Elimination of silos of information

• Ongoing
  • Supports your records management requirements without a hybrid farm, automatic in-place record declaration
  • Protects your confidential assets, in real-time, removes from search, disables download
  • Standardizes business processes across all environments
  • Enterprise policy and governance enforcement, across on-premise and the cloud

What can you solve?
  Search
  Records Management
  Data privacy
  Migration
  Security
eDiscovery
Content management
Collaboration
Business social networking
Text analytics
Evaluating Solutions
A Few Questions to Ask to Get You Started

• How often should a drive or repository be indexed for new content?
• Does the system need to perform in real-time?
• Should old content be re-classified to determine if it should be classified according to a different category?
• How are classification errors solved?
• Should the user have the ability to override the classification assignment?
• How long should deployment and ongoing management take?
• How much end user involvement can be eliminated?
• How does the system handle vocabulary and/or language ambiguities?
Calculating ROI
Show me the ROI

- Create enterprise automated metadata framework/model
  - Average return on investment minimum of 38% and runs as high as 600% (IDC)

- Migration, can individuals ensure the right documents are migrated and the sensitive ones are removed!

- Apply consistent meaningful metadata to enterprise content
  - Incorrect meta tags costs an organization $2,500 per user per year – in addition potential costs for non-compliance (IDC)

- Guide users to relevant content with taxonomy navigation
  - Savings of $8,965 per year per user based on $80,000 salary (Chen & Dumais)
    - 100% ‘recall’ of content, 35% faster access to content ‘precision’

- Use automatic conceptual metadata generation to improve records management
  - Eliminate inconsistent end user tagging at $4-$7 per record (Hoovers)
  - Improve compliance processes, eliminate potential privacy exposures
• The Business Solutions
  • Search
  • Records Management
  • Migration
  • Data Security
  • eDiscovery/Litigation Support, FOIA
  • Information Governance
  • Text Analytics
  • Social Tagging
  • Collaboration
  • Content Management
  • Metadata Management

Business
  • Reduced business risk
  • Faster and Better Decisions
  • Increased Output
  • Reduced & Avoided Cost

$200 - $300K
Annual Cost Savings
1st Year ROI

Process
  • Fewer errors & re-work
  • Shorter Process
  • Automation
  • Simpler Data Entry/Access

50-80%
Shorter Cycle Time
Up to 90%
Fewer Errors/Re-work

IT
  • Unified Access Control
  • Faster Deployment
  • Utilize SharePoint to Extend LOB

60%
Faster Deployment
95%
Fewer IT Support Hours

Pique Solutions
Intelligent Metadata Enabled Solutions in Office 365, OneDrive for Business, or a non-Microsoft Cloud Environment
“By itself the search function has limited value. The real value of search and information access technologies is in the ongoing efforts needed to establish effective taxonomies, to index and classify content of all kinds, in order to provide meaningful results.”

Tom Eid, Research Vice President Gartner Group
Metadata Drives Precision Search

- Keyword search captures only 33% of relevant information. Consistent, meaningful metadata ensures all relevant information related to key words will be returned.
- Users can’t navigate to information. Taxonomies provide consistent guided navigation for end users to extract relevant information even in external content. Taxonomy navigation is 36%-48% faster and more efficient than lists.
- Vocabulary normalization across diverse geographies and cultures causes issues and inhibits sharing of knowledge and expertise due to nomenclature.

Knowledge Workers’ Challenges

- 15% of their time is spent duplicating information
- 25% of their time is spent searching
- 40% can not easily find the information they require to do their job
- The cost to a 500 employee company is $2.4 million per year in inefficiencies and lost productivity (Gartner Group)
Case Study – Intelligent Search

Situation:
• Not-for-profit organization that contributes to the prevention and cure of cancer
• More than 30,000 users
• Outpatient treatment programs that record more than 328,300 visits a year

Challenge:
• Portal to enable patients to access information relevant to their specific health situations
• Accurate, medically sound, and secure information necessary
• Aggregate content from internal and external sources

Solution:
• conceptClassifier for SharePoint platform
• SharePoint 2010
  Microsoft FAST Search
• Integrated solution with partner Aeturnum

Benefits:
• Accuracy of search
• Relevance of results
• Confidence in data
• Control and trust

“With more than 30,000 current users, the MyMoffitt Patient Portal has seen significant growth, and of the new patients that come to Moffitt, 87% register for a patient portal account. All developments and enhancements are about improving the patient experience.”

Jennifer Camps, Director of Portal Technologies and Data Management, Moffitt Cancer Center

Read the Case Study
Data Privacy and Cyber Security

• Works in conjunction with security applications, or as a stand-alone application
• Protects and secures content assets from search and portability such as
  • Personally Identifiable Information (PII)
  • Protected Health Information (PHI)
  • OPSEC
  • Or any metadata that is deemed confidential by the organization
• Identification in real time as content is created or ingested
• Same approach as records management
  • The taxonomy standardizes the process of identifying all possible privacy data exposures – digital and handwritten

Data Breaches and Exposures Challenges

• Average cost of a data breach is $6.3 million and ranges from $225 thousand to $35 million
• Average cost per exposed record is $197 and ranges from $90-$305 per record
• 70% of breaches were due to a mistake or malicious intent by an organization’s own staff
• Healthcare provider - $7 million, TJX Companies - $256 million, ValueClick - $2.9 million
Case Study - Search, Data Privacy, Records Management, Migration

Situation:
• Budget of $6.9 Billion
• Over 60,000 users
• Runs 75 hospitals and clinics providing care to more than 2.6 million beneficiaries

Challenge:
• Data Privacy
• Intelligent Migration
  • Before and after
• Records Management
  • Pilot project: 72,000 Site Collections, 5,300 retention codes, classify 200,000 documents per hour with minimum resources

Solution:
• conceptClassifier for SharePoint platform

Benefits:
• Automatic tagging based on organizational vocabulary and descriptors
• Automatic routing and the ability to change the SharePoint content type
• Eliminated manual tagging, removes from unauthorized access and portability
• No security exposures or breaches in 4 years

“Concept Searching’s Taxonomy Manager provides our Subject Matter Experts with a user friendly web interface enabling the development of controlled vocabularies that can be used to filter search results and auto-classify content to folder structures.”

J.D. Whitlock, Lt Col, USAF, MSC, CPHIMS
Air Force Medical Service

Read the Case Study
‘Intelligent’ Migration

- Standalone or in conjunction with migration application
- Pre-migration: As content is migrated it is analyzed for organizationally defined descriptors and vocabularies, which will automatically classify the content to taxonomies or optionally the SharePoint Term Store
  - Security rights maintained
  - Safeguards document confidentiality and identifies security exposures and records that were previously unknown
- Index content
  - File Shares to File Shares, File Share to SharePoint
  - SharePoint to SharePoint
  - Custom Action – from any other repository (.NET code and Web services)
  - Plug in architecture to custom develop content sources and destination sources
- Post migration: Taxonomy hierarchy can be used to improve search as content will be organized by concept and enable the ability to find relevant content that was previously unable to be retrieved

Migration Challenges

- 84% of data migration projects fail (Bloor)
- 72% of organizations delay migration because it is too risky (Bloor)
- 70% of projects reported schedule overruns of about 30% while 64% reported budget average budge overruns of 16% (Hitachi Data Systems)
- Survey respondents rely on end users to validate whether their data migration was successful or not (Enterprise Strategy Group)
Case Study – Intelligent Migration

Situation:
• Multiple Clients

Challenge:
• Simply moving content to new location did not provide any benefits
• Human error and time was too costly
• Quantity of content too great

Solution:
• conceptClassifier for SharePoint platform

Benefits:
• Cleanses irrelevant and unnecessary documents
• Dramatically reduces the time for migration
  • Eliminates manual intervention
• Improves the outcome enabling improvements in:
  • Search
  • Records management
  • Data privacy
  • eDiscovery and litigation support
  • Text analytics

conceptClassifier for SharePoint identified 66,000 duplicates out of a total of 270,000 documents, representing a 24% reduction in disk space.

Automotive Parts Company
The goal was to improve search for 147,000 business users but needed to migrate literally millions of documents.

conceptClassifier for SharePoint was used for the pre and post migration and for enabling concept based searching with their existing search engine and taxonomy based search after the migration.
Office 365 Case Study
Situation:
- Global services firm
- SharePoint environment
- Over 170K users located across the globe - Americas, Europe, Middle East, India, Africa (EMEIA), Asia Pacific, Japan

Challenge:
- Ability to communicate real-time with end users and clients regardless of where they reside or how they are connected
- Information Governance issues

Solution:
- concept Classifier for SharePoint
- concept Classifier for Office 365
- concept Classifier for OneDrive for Business
- concept Taxonomy Workflow

Benefits:
- Hybrid environment with Information Governance enforced across the global enterprise – migration, data security, search, content management, records management
- Improved communication and access to real-time information
- High performance and scalability
- One core set of technologies – deploy once use for multiple applications
QUESTIONS?
If you would like to see a demonstration or ask any further technical questions, please come by Booth P3 for a chance to win Bose headphones!
Thank You

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