5. Impact and Benefits
The project was delivered on time and on budget - unusual for a project of this scale - and the project was hailed as a great success by the client, part of a large-scale reorganisation of their IT capability. Reed have continued to innovate in search and have developed many further systems using a similar platform. The project was a success due to careful planning, tight project management and the clear benefits of moving to an open source solution - flexibility, scalability, no vendor lock-in and no license fees.

6. Next Steps
Flax has continued to work with Reed to develop powerful search-based solutions for other areas of their business. Flax has also since worked with other recruitment firms to develop similar capabilities.

4) DAVE CLARKE

OASIS: Constructing knowledgebases around high resolution images using ontologies and Linked Data

1. About the Case Organization
Synaptica produces software solutions for: building and managing taxonomies and crosswalks; designing and deploying knowledge organization systems; indexing and enriching content; and optimizing search, navigation and discovery.

2. About the Challenge
Visual images provide a valuable complement to textual information, but a vast amount of the information inside photographs, paintings, diagrams and drawings can be seen but not searched - it has been inaccessible to traditional query methods.

Many business applications could benefit from the ability to search inside images including: medical and scientific imagery, reconnaissance and intelligence, engineering and design, forensics and security, education and cultural heritage.

3. What We Did
Synaptica built a software system called OASIS that allows points and regions inside images to be highlighted and annotated. These visual features are then tagged using taxonomies and Knowledge Organization Systems. The software makes visual content searchable with pin point accuracy. It also promotes knowledge discovery as the application dynamically identifies features and related concepts as the user freely pans and zooms around an image.

The key technologies behind the solution are Linked Data and RDF graph databases. These allow users to connect to vast amounts of high-quality structured information in the Linked Open Data cloud, including authoritative Knowledge Organization Systems and ontologies. The extensive use of ISO and W3C standards and specifications ensures data portability and systems interoperability.

The fusion of several core technologies (high definition imagery, Linked Data, Knowledge Organisation Systems and semantic annotation) represents an innovative solution that opens up new opportunities for enriching visual content.

4. Challenges and Lessons Learned
Working with external data sources from the Linked Open Data cloud presents a number of challenges: (i) external data can be accessed by live queries to remote third-party servers, but these remote systems may not be able to provide adequate uptime availability or responsiveness; (ii) copies of external data can be ingested into local systems, but some datasets, such as DBPedia, may be too large to be accommodated on the available data storage; (iii) while graph databases out-perform relational databases at pattern-based queries, relational databases typically out-perform graph-databases at indexed or full text searches.

Synaptica responded to these challenges by building a flexible system that can simultaneously query data from any number of internal or external data stores. Low volatility data of a manageable size can be ingested while high-volatility or very large datasets can be accessed on remote servers in real-time.

5. Impact and Benefits
The result of the effort is a robust and scalable general purpose toolset that can be used to build taxonomies, access external Linked Data, and annotate image content. By leveraging Linked Open Data, much of which is available without license fees, the time and cost to deploy knowledge organization systems can be greatly reduced.
OASIS
IKO Case Study
Deep image indexing using Linked Data
“the pitch”

PICK ME if you’re interested in...

Building your own taxonomies

Accessing freely available Linked Data

Designing knowledge discovery apps

or if you just want to see some really pretty pictures
Ingest images of any size, including ultra high definition / giga-pixel images

Define and address individual spatial points or bound areas on images

Index points of interest to taxonomies and support search and navigation of sub-image content

Express everything as Linked Data and publish to any device
OASIS Linked Data Content Enrichment Pipeline
the result, a cool knowledge discovery app...

...built entirely with Linked Data
the front end
discovery tools pan-and-zoom around the image
each visual feature gets its own HTTP-URI

Hi, my name’s Venus, you can find me at:

http://oasis-0-8-0.linkmuse.org/data/annotations/the+birth+of+venus#i4skg93t1453
images are conceptually indexed
a tag cloud updates as the image is moved
revealing the ideas behind the image
clicking on any concept allows redirection
or discovery of other images on the same idea
or you can ‘search inside’ the image
the back end
we built tools for making annotations
and for indexing content
for configuring ontologies
and designing KOS schemes
finally, tools to build your own taxonomies
challenges
the challenge of global data sets

**Speed**
- External data servers and/or network latency may not deliver required performance

**Availability**
- External data servers may not guarantee required up time

**Volatility**
- External data sources may contain constantly changing content

**Scale**
- External data sources may be sufficiently large to make local storage uneconomic

These factors encourage ingesting local copies as reference data sets

These factors may necessitate real-time access to external data sets
how we work with global data sets

Globally Distributed OASIS Servers
cached copies of key reference taxonomies

OASIS Application Server
Federated SPARQL queries gather and merge results from distributed data sources

The OASIS knowledge graph writes to a local triple store

LOD Cloud
externally curated Linked Open Data

GeoNames

OASIS graph database
we can explore any of the following:

- external Linked Data resources
- KOS schemes & ontologies like DCMI, SKOS & FOAF
- tagging with controlled vocabularies
- knowledge discovery versus search
- working with globally distributed data