

am broðnoma at bgr huar er þu in hapa stadar i hi lesk
er þar v i bændaganu z þar þrágað er inoe stullu son vor
at sin hapa ut um þær of bgr z nabbur noðm hapa be
h v o f iudá ap þ utreignu e h seipre hapa sem hingat at
noðstid sem starr mu sage vat. þ e er r þær hegr ap sunu um
at aller valla þ þ e bændaganu bann at h þær a pallar a orninn
ea po teg suo hþ vand lto. Vort eb e þu huo horta hingat be
ypu l e b leppa dnylcedinga dndaun dnyrbled e d po bkan all
z lauhga segur lár mu gmr at huoru hær eb h ar þær huo
mogia in segre. e huoru uog sem þ heg vir þa bo al. þu r þ
alldyr apar al v f nos e po ballar þu les z oðx unu of bgr
þ er moð angriðe at mulla slub hoidiga va f harnul leim at
h vi alþure þo at h in þær e z sinu þær lide. hþ. q. v. þ
sgr uat in ne meira mun in stid op hida ljdu þær z lað
landuord þ liu hndm uarri all þær avants ellde þ liubá tolla
heda hru ep hauba habþu isþur lipa. e po at stynlari in
þ e þær uor f atrenganu segdi þu þ e stidat la al of bgr þa
þær emge þra þullan vudm mega alera huor bgr in
þan f þuor hapa þær eb e. nu að vort huar bo b. stull
sage e narre uat of bgr að h stoll þ þær **segur em þ b bær þ**

Sua sagde at uat þamb. at þa er að f. soem apr i þ e
vur a ordin et lipþingune þa la ord þ e bgr at blo
d droþ þær iný a þri þu bgr vnda healmnu e h h
þær aþuþe. e er að nullat at hinga huar þu þær e vadi

Sua e sage at þa þær hapa þu a aðe degi vada þu þær aðe
seipre þu manad þer enie nar ep vada at þu a aðe þu
nar huar þu hollþgan uor hru þu xpi þu þu þu ana þu a ar
ea aðe vadi aðe þu aðe bgr z a v u are al þu þu þu þu
ngu þu þu þu bgr ep stina are aðe þu aðe aðe þu þu
þær in þ u þu e hærþer þu a **segur þu þu þu**

Et er lober uter mende þu a orninn nar h þær þu
aðe al þu þu. þu þu þu in þa v þu þu þu
aðe up undu þu þu þu hær þu þu z græ þu þu
ea er aðe þ. la þ. þa ge h ar þu z nu in þu þu þu
hapa oðr þu þu þu þu þu þu þu þu þu þu
in þu hær ge þu þu þu in þu þu þu at þer se nar þu oð
þ þu þu þu þu sem v e. nu in þu at e ma apr taka in þu
uor þa se mer þ boera sem ma ar ep eb þær uorþur z þu þu
þ. eb ga þu þu þu f alla þu þu eb ma meira z þu þu þu
in þu þu. þu oð. þu þu þu hær eb nar ap þu þu þu þu
godulua sem þu in þu þu þu þu z þu þu þu eb þu þu
eb ma þu oð þu þu þu þu þu þu þu þu þu þu þu
ta þu þu at eb aðe in eb uon þu nar þu. z at þu þu þu
þu þu at h nar þu hær eor ne þu þu þu þu þu þu þu
þu þu þu þu in vi þu þu þu at nar þu in þu þu þu
e þu nar þu z la bgr h ep þu þu þu þu þu þu
þu þu z nu þu þu þu aðe þu þu þu þu þu þu þu þu

u er þu þu at taka e hþ unu

Applying the semantic web to the Arnamagnæan manuscript collection

Project funded by the Nordunet2 research programme

Gardar Gudgeirsson - Raqoon ehf - gardarg@raqoon.com - <http://www.raqoon.com>

Project participants

- ⊕ Stofnun Árna Magnússonar á Íslandi
- ⊕ Det Arnamagnæanske Institut
- ⊕ Raqoon ehf

Project overview

- ⊕ The project seeks to investigate the applicability of **semantic web technologies** for the manipulation of digital library data
- ⊕ Manuscript data from the Arnamagnæan institutes is used as proof of concept
- ⊕ The project is funded by the **Nordunet2 research programme**



Project benefits

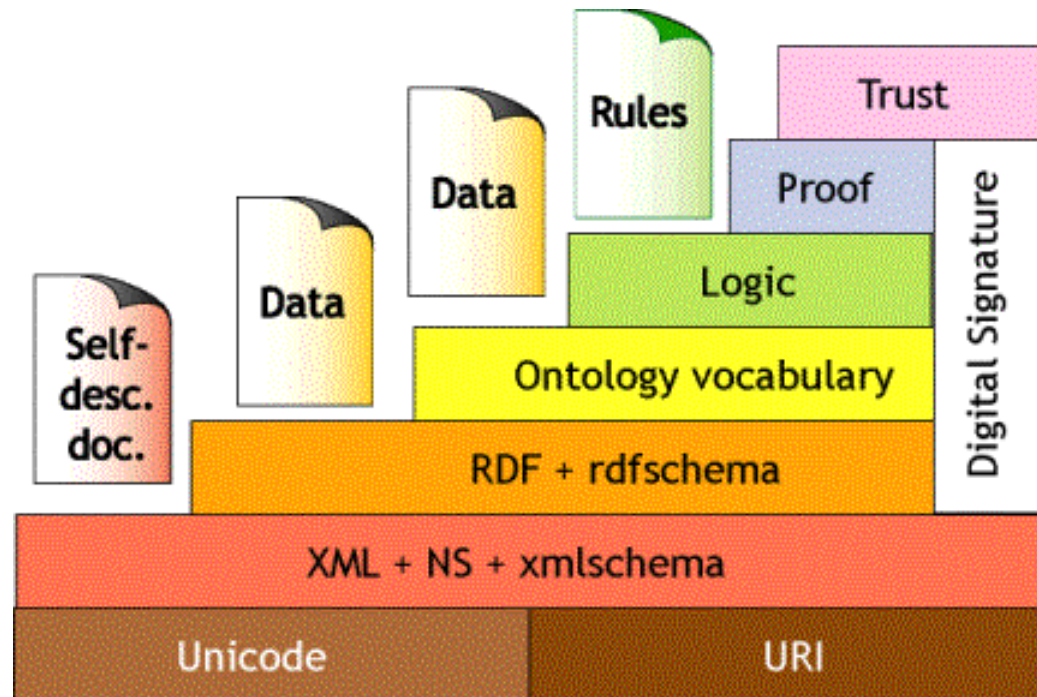
- ⊕ Allows end-users to browse the Arnamagnæan digital collection through the web in more intelligent and useful ways than before
- ⊕ Enables computers to process knowledge that up until now has only been available on paper (or inside the heads of scholars)

The semantic web – what is it?

- ⊕ The information on the world-wide-web is mainly intended for consumption by humans
- ⊕ The “semantic web” is an effort to make the web more friendly towards machines, with the ultimate aim of making the data more accessible for humans

The semantic web - architecture

- ⊕ Tim Berners-Lee (the inventor of the web) has proposed this as an architecture for the semantic web:



The Arnam agnæan m anuscript collection

- ⊕ Around 3000 items
- ⊕ Mostly Icelandic manuscripts but also Norwegian, Danish and Swedish
- ⊕ Stored in Denmark and Iceland

The Arnam agnæan digital collection

⊕ Current collection...

1. Digital images of manuscript pages
2. Electronic catalogue (XML)
3. Text archive (XML)

⊕ This project adds...

- XML metadata describing the content of digital images (MIML)
- XML metadata describing the semantics of the collection as a whole (MSML)

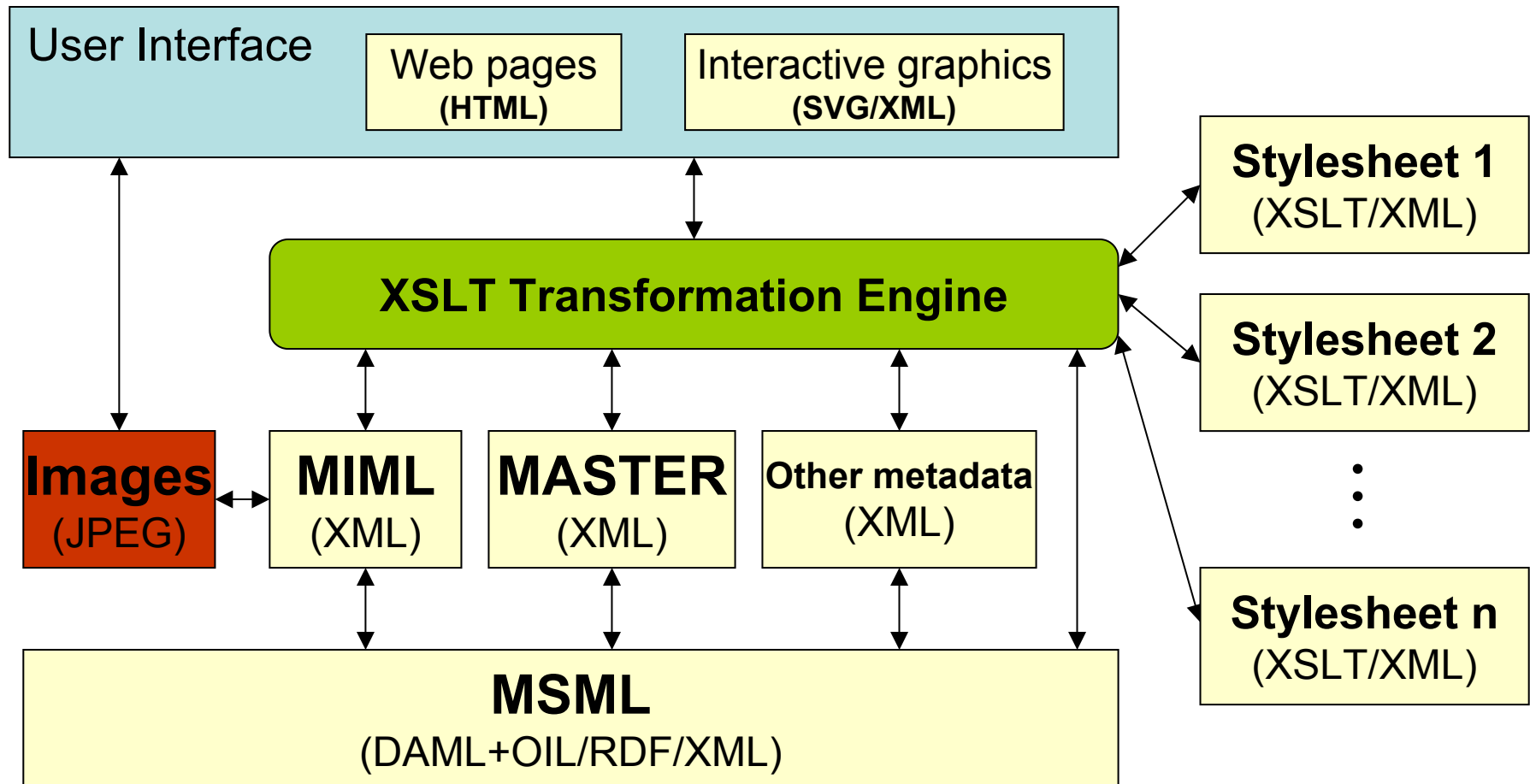
M I L

- ⊕ **Manuscript Images Markup Language**
- ⊕ XML dialect to describe the contents of manuscript images
- ⊕ Enables the creation of advanced user interfaces
- ⊕ Serves as a metadata layer above the digital images, providing access for the semantics layer

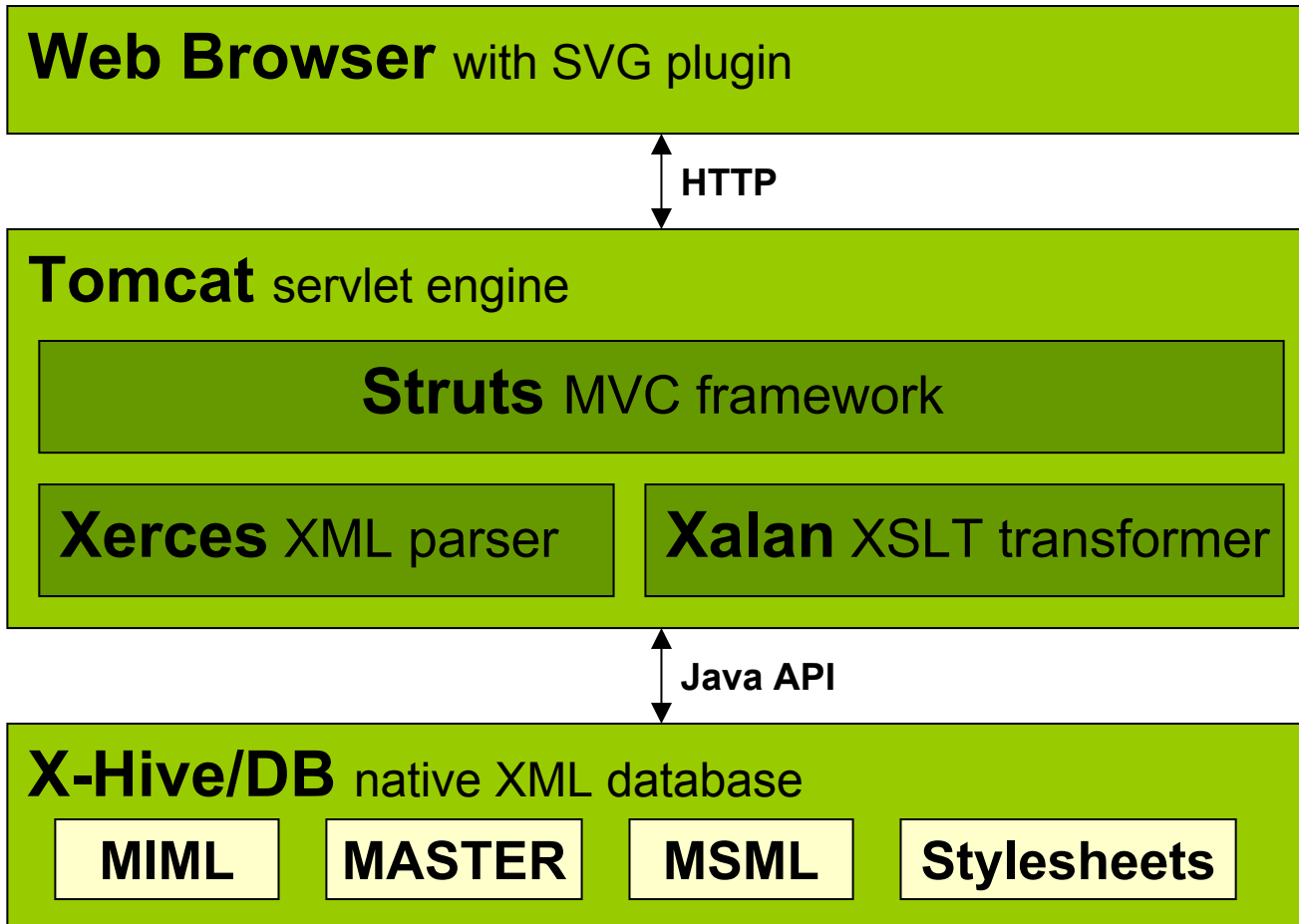
M S M L

- ⊕ **Manuscript Semantics Markup Language**
- ⊕ Describes the semantics of the manuscript collection **as a whole**
- ⊕ MSML is split in two parts:
 - ▣ Core ontology (of which there is only one)
 - ▣ Ontology instances (of which there can be many)
- ⊕ Uses DAML+OIL (Darpa Agent Markup Language+Object Inference Language) to model the semantics
 - ▣ DAML+OIL is RDF, which in turn is XML

Architecture - Metadata view



Architecture - System view



Software Demonstration

⊕ This demonstration will show:

- How MIML data (stored in a native XML database and transformed into SVG for visualisation) augments images of manuscript pages
- How MSML data (also stored in a native XML database and transformed into SVG for visualisation) is useful for intelligently linking manuscript related information with other information sources (in this case an ancient map)

Problems encountered during the project

- ⊕ Bridging the gap between the technological people (Raqoon) and the manuscript people (the two Arnamagnæan institutes) was hard
- ⊕ We may have tried to climb too high in the semantic web architectural stack
 - ▣ DAML+OIL might be overkill, RDF could have sufficed for the project
- ⊕ Non-technical people find it hard to work with MSML (MIML is ok)

Dissemination of results

- ⊕ Project ends on the 1st of June with a grand opening
- ⊕ For the Arnamagnæan institutes this project means...
 - ▣ ...a much bigger audience for Icelandic manuscripts
 - ▣ ...a rich toolset for creating Internet exhibitions
- ⊕ For Raqoon this project means...
 - ▣ ...technological leadership in advanced digital libraries
 - ▣ ...opportunities in other areas, such as knowledge management