The identification of XML-related skills gaps
in the aerospace & defence industry in the West Focus region

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RATIONALE

The aerospace and defence sectors are subject to mandatory compliance involving XML standards, especially in the content and management of classified documents. Such companies are well represented in the West Focus region and this is an area where Government and industry have identified burgeoning computing skills shortages, partly because the lower, less skilled end of the software and associated ICT sector is increasingly outsourced to India and other countries. Thus West Focus/Kingston University set a survey & study in motion aimed at identifying skills gaps in this sector which will enable us to propose a strategy as to how any skills gaps discovered could be addressed.

INTRODUCTION

Major areas such as health (NHS), e-government, and defence, have mandatory compliance requirements for data interchange & management and these are XML-based

For the defence sector, including aerospace, these standards are internationally agreed and enforced and extend for the complete system lifetime. The 'US Navy Electronic Technical Manual XML DTD' supplies one example of the effort to create XML document models for genres previously in SGML and specifications and indeed manuals in the aerospace industry have rapidly moved from print media to electronic media using e.g. the ISO/IEC 11179 standards for describing data elements. Furthermore, for UK SMEs, the burden of security compliance is mandatory. The Security Assertion Markup Language (SAML) is relevant to Information Security Management Systems (ISMS) and ISO 17799/BS 7799 is a standard setting out the requirements for Information Security, as is Securities Standard 'ISO 15022 XML'.

We intend to investigate how and to what extent, SMEs in the regional aerospace & defence sector are able to meet these obligatory document management standards, since initial networking implies that such companies may lack essential XML skills, in order to map both competencies in this area, as well as potential training needs.

THE STUDY FRAMEWORK

An initial list of 2144 companies of all sizes active in this sector in the UK was compiled. From this those in the regional/geographical area 230 were selected and placed into three categories; Tiers 1, 2 & 3:

1. Tier 1 is an organisation which produces an entire aerospace or defence project for an end client (Airline, Defence Ministry). They are most often the prime contractor.
2. Tier 2 is composed of suppliers of components to a Tier 1 prime contractor. Typically these suppliers components will be complex assembled units e.g. an engine or wing etc
3. Tier 3 is composed of suppliers of small components to Tier 1 or Tier 2 contractors. Typically these suppliers' components will be small and un-complex e.g. rubber seals, hoses etc

The 230 were contacted using the questionnaire in Appendix A as telephone script. Of these 52 gave partial replies and 34 complete replies. Of these, 2 confirmed that they belonged to Tier 1, 12 confirmed that they belonged to Tier 2 and 6 confirmed that they belonged to Tier 3. The remainder were not clearly self-classified and were thus assigned to Tiers using best judgement; the results of which corresponded roughly with the sizes of the above division (10% T1, 60% T2 & 30% T3).

RESULTS

Over half of the respondents (60%) stated that they did not, or were unable or unsuited for producing original documents in XML format for a number of reasons: Only 33% of the companies called were producing components that would require original technical documentation of the kind that may be aided by XML. 13% of the companies solved their XML and documentation problems by outsourcing their technical publications to other companies, but unfortunately very little information could be gathered directly from phone calls to companies that outsource their publications. The remaining organisations were made up of various sorts within the aerospace and defence industry that complimented component producers such as suppliers, retailers and testers, where any documentation received by the company is largely passed on "as is".

Relatively large proportions (27%) of respondents (suggested by a "may be" response) were companies where the XML format may have potential, but is not yet "on the corporate radar". This is supported by the disconcerting degree of confusion in this group, e.g. XMetaL users say they don't use XML and yet XMetaL is only used for XML editing. Furthermore 8 companies said they use a Common Source Data Base yet only 3 of these companies said they work to S1000D standard, despite the fact that Common Source Data Base only applies to S1000D users.

Finally, 13% of respondents were clear about the technical side of XML and the documentation standards required. However 0% of respondents (including Tier 1) reported that they are extremely confident about mastering all of the techniques required. Thus it is likely that these are companies that would benefit not only from the implementation of an XML type system to aid their publishing process, but also that this should be backed up by relatively specific and advanced training.

Of the 22 respondents who produce technical documentation, the majority only have 1 to 5 technical authors. Examining the tier classifications gave a further idea of the types of organisation involved and indeed, based on the definitions given on the survey (above), it is probable that Tier 3s will be producing minimal amounts of technical documentation and are therefore unlikely to need an advanced XML based solution. The survey backed this up, showing that Tier 3 organisations only produce a relatively small amount of documentation compared to those falling under the Tier 1 and 2 categories. Indeed where documentation was received by Tier 3 companies, it was largely passed on up the chain "as is". There is a good potential for introducing around 25% of these companies to minimal, user-friendly XML-based solutions because although they may be dealing in parts which may be used to make up a sub assembly, XML will actually become more relevant to a supplier when they are producing a sub assembly rather than individual parts.

Respondents reported using a range of editing software, including Solidworks/TEDS, XMetaL, Arbortext Editor, Adobe FrameMaker (including combining Arbortext Editor and Adobe FrameMaker), Corel Ventura, MS PowerPoint, MS Publisher, "spreadsheets" and MS Word. Arbortext Editor was overall the most popular editor cited but we know that in the whole of the UK at the present time there are more users of FrameMaker than users of Arbortext.

CONCLUSIONS

There is a good potential for introducing minimal, user-friendly XML-based solutions to around the 25% of Tier 3 companies and thus education around documentation and XML should take the form of a widely-applicable short course where participants can also "hands-on" try different systems and editors, which will enable them to then make a qualified choice regarding which software best suits their needs.

Between 20% and 40% of companies – largely from Tier 2 – are likely to benefit from the implementation of an XML type system to aid their publishing process, provided that it demonstrates a sound business benefit in time or costs savings (i.e. their production involves a significant amount of authoring and/or lengthy system lifetimes). Such companies may well benefit from the type of technical short course proposed above (e.g. a general overview of some features of XML plus trying different document management systems and editors) but they probably also have a larger need with respect to guidance or consulting as to how to develop their existing capacity, at management level. Once this is in place, relatively specific and advanced training can be planned.