

1. the title of the tutorial

Developing Digital Ecosystems for the Web

2. the length : half day (3 hours plus breaks) or full day (6 hours plus breaks)

Full day (6 hours plus breaks)

3. the intended audience (introductory, intermediate, advanced)

This tutorial is suitable to all audiences engaged in the development of digital ecosystems for the Web.

4. the complete contact information for the contact person and other presenters

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5. a brief biography (max. 2 paragraphs) for each presenter

Peter Eklund is Professor of Information Systems and Technology and Director of the Centre for Digital Ecosystems at the University of Wollongong. A member of the Smart Services Cooperative Research Centre, Peter is the lead technical researcher in the Virtual Museum of the Pacific project, a digital ecosystem being developed for the Australian Museum and its stakeholders in Sydney. Peter has held chairs in Computer Science and Information Systems and teaches knowledge and information design, .NET programming, databases and information systems management subjects at the University of Wollongong. An Australian Research Council ARC and Canadian NSERC reviewer, Peter regularly serves on accreditation panels and is an elected Fellow the Australian Computer Society. Peter was Program Chair of the 16th International Conference on Conceptual structures (see <http://www.iccs.info>) in Toulouse in 2008.

6. the audio/visual equipment needed for the presentation.

LCD projector, will use PowerPoint (or Keynote).

The extended abstract should be 4 to 6 pages, and should include an outline of the tutorial, along with descriptions of the course objectives and course materials.

Course Objectives:

- Present the fundamental metaphors of the digital ecosystem for the Web
- Introduce the domain of a suitable case study of the Virtual Museum of the Pacific
- Examine the business and organisation for a digital ecosystem
- Introduce the sources of data, structured and unstructured, formal and informal
- Examine the data requirements and issues in DE data capture and extensibility
- Present the techniques that deliver a solution to data integration issues
- Discuss Service Oriented Architecture as Digital Ecosystem backbone
- Provide a detailed example of the Web services that can be used for a DE
- Introduce the issue of social media tagging as folksonomy maintenance
- Present an access control model that supports the solution to multiple folksonomies
- Examine user interface design and technical requirements issues
- Present user interface evaluation methods for DE performance measurement
- Understand organisational and corporate measures of DE impact and success
- Survey the evaluation of social media applications on the Web
- Discuss future trends in DE for the Web

Course Materials:

The tutorial will be supported by handouts and extensive references.

Tutorial Outline

A digital ecosystem is an ICT-enabled business framework that can be delivered on a number of platforms including the Web. This tutorial presents a detailed case study of the experience of building a digital ecosystem for the Australian Museum's stakeholders called the Virtual Museum of the Pacific. We show how the framework can be re-used to build other digital ecosystems. Two hands-on exercises frame the presentations in the morning and afternoon sessions of the tutorial. The design of the tutorial is to provide a balance of deep technical insight and experience with sharing more general observations from a case study activity. For this reason the tutorial would be of interest to a broad audience in DEs.

The tutorial starts by establishing a business case for a Digital Ecosystem (DE), we begin by asking what are the business objectives necessary for an organisation to develop a DE? What can a organisation expect from a DE? Can all the business opportunities be known in advance? In the case of the Virtual Museum project we examine the organisational setting for the establishment of the DE and considering the emergent business development opportunities that result from its development.

We begin the technical presentation of the tutorial by identifying each of the ecosystem elements of the DE for the virtual museum. This gives orientation to the DE paradigm but also introduces the particular domain of the Virtual Museum of the Pacific project that will be used as a continuous case study for the remainder of the tutorial.

A critical technical issue for a DE is the quality of the data model; this often involves a reverse engineering activity, to model some legacy database or information system, and then a forward engineering activity; that amends the data model for the purpose of extensibility. In the case of the Virtual Museum of the Pacific, the technical project members had to pull apart a museum asset management system, understand and analyse the museum's ontology and classification system and then forward engineer an extensible data model that would serve the Virtual Museum's DE. Our experience suggests the universality of these activities, the tasks are general to any DE development. Since they involve systems analysis, database normalization and knowledge organisation, the process we describe will interest an audience trained in Information Systems, Artificial Intelligence and Database Management. This is the most challenging stage of the tutorial but we present a step-by-step exercise in the morning session that transforms a legacy data model, its data and associated hierarchical tags into a new extensible data model for a DE. Some familiarity with EER diagrams is the only assumed knowledge for this exercise.

Web services provide the backbone for DE on the Web. They enable Web 2.0 Rich Internet Application to be written, they encapsulate service IP and allow

complex interacting data services to be composed. We describe a Service Oriented Architecture for the Virtual Museum project and illustrate and run examples of these service calls, introducing them as atomic operators for our case study.

One or more of these services involves computing formal concepts; these are maximal sets of objects that exhibit a set of attributes. We explain this idea and introduce it as a way of maintaining and computing a hierarchical structure that can be used for generating folksonomies. A small exercise in the afternoon session of the tutorial gives participants opportunity to experiment with this idea by considering two real set of objects and their attributes and inducing and analysing the resulting folksonomies. The outcomes reinforce the need for a DE to support multiple hierarchies reflecting different understandings of data.

Tagging, folksonomies and social media are fundamental to DEs on the Web, to support this feature we show how an access control model is necessary to maintain data integrity while supporting knowledge capture and multiple viewpoints. We present this access control model and examine its design and implementation.

Lastly, the tutorial considers the technical issues surrounding interface design and user interaction. This in turn raises the question of evaluation, usage and measurement of DEs, including finally methodologies for measuring the organisational impact of a DE and some observations from the broader literature on the evaluation of social media systems in general. We emphasize some of the differences and similarities between social media system evaluation and DEs. Future trends in DE and social media will be examined and discussed with the audience.