

WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS



# e-Commerce and Information Management

#### **Overview**



- Business process focus
- e-Commerce
- Information Management
- WS-SOA
- WU
  - Digital resources in "learn@wu"
  - RBAC



#### **Business Process Focus**



- Business Process (BP) Focus
  - Defines need for exchange of information
  - Broken up in constituting "business transactions", e.g.
    - Order transaction,
    - Invoice transaction,
    - Payment transaction, ...
  - Paper-based documents representing BP
    - forms, patents, etc.
  - Evolving IT infrastructures determine how BP may get supported, e.g.
    - from proprietary physical communication connections to Internet (independent of physical connections)
  - Perspective of the business, not the customer



#### e-Commerce



- Business-to-Business (B2B)
  - End of 70's, begin of 80's
    - Proprietary communication lines
    - Proprietary Protocols
    - Electronic Data Interchange (EDI) and Electronic Funds Transfer (EFT)
      - (ASCII) Text encodings
      - Automating business functions of business processes
    - Raise of Enterprise Resource Planning (ERP) Systems
    - Standardisation efforts
      - United Nations/Electronic Data Interchange For Administration, Commerce and Transport (UN/EDIFACT)
        - Exchange of documents (invoices, shipping orders, etc.) in electronic form



#### e-Commerce



- Business-to-Business (B2B)
  - Since the beginning of the 90's
    - Internet
    - http
    - HTML
  - Since the beginning of the 00's
    - XML
    - e-Business XML (ebXML)
      - Organization for the Advancement of Structured Information Standards (OASIS)
      - United Nations/Centre for Trade Faciliation and Electronic Business (UN/CEFACT)
      - ISO standard (ISO 15000)
    - Universal Business Language (UBL) by OASIS
      - Presale, Ordering, Delivery, Invoicing, Payment
      - Northern European Subset (NES)
        - Denmark, Sweden, Norway, Finland, UK, Iceland)



#### e-Commerce



- Business-to-Consumer (B2C)
  - Since the beginning of the 90's
    - Proprietary networks
      - eg. "MS-Net" with Windows95
    - Internet
    - http, shttp
    - HTML, XML



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- Digital information
  - Digital goods
    - e.g. music
  - Digital forms
    - e.g. order
  - Digital services
    - e.g. queries
- Managing (and securing)
  - Sources
  - Creation
  - Distribution
  - Access





- ISO/IEC 27002:2007 (JIS Q 27002)
  - Information Security Management Systems (ISMS)
  - Defines best practices for (excerpt)
    - Security policy
    - Organization of information security
    - Communications and operations management
    - Access control
    - Information security incident management
    - Compliance (with information security policies)





- Control Objectives for Information and related Technology (COBIT)
  - Information Systems Audit Control Association (ISACA), IT Governance Institute (ITGI)
  - IT governance and audit
  - Public Companies subject to U.S. Sarbanes-Oxley (SOX) Act 2002 encouraged to also adopt COBIT
  - Security related IT processes in COBIT objective domains overlapping with ISO/IEC 27002 (JIS Q 27002)
    - Plan and Organize (PO)
      - PO2: Define the Information Architecture
      - PO5: Manage the IT Investment
      - PO6: Communicate Management Aims and Direction
      - PO7: Manage IT Human Resources
      - PO8: Manage Quality





- Control Objectives for Information and related Technology (COBIT)
  - Security related IT processes in COBIT domains
    - Acquire and Implement (AI)
      - AI1: Identify Automated Solutions
      - AI6: Manage Changes
    - Deliver and Support (DS)
      - DS2: Manage Third-party Services
      - DS4: Ensure Continuous Services
      - DS5: Ensure Systems Security
      - DS7: Educate and Train Users
      - DS11: Manage Data





- Information Technology Infrastructure Library (ITIL)
  - United Kingdom's Office of Government Commerce (OGC)
    - Books defining concepts, guidelines and practices for
      - Information Technology Services Management (ITSM)
      - Information Technology (IT)
      - IT operations
  - ISO/IEC 20000, "IT Service Management"
    - Reflects ITIL best practice guidances
    - Generically enough to be able to support COBIT



# WS-SOA



- Advent of the Internet
  - Public m:n-communication becomes possible
  - Worldwide
  - Cheaper compared to earlier infrastructures
- Exploiting the Internet for carrying out business processes
  - Interfacing with own central servers
  - Exchanging data with own chain stores
  - Exchanging data with business partners
  - Exchanging data with customers
- Need to standardize services in the context of the Web
- Security (accessibility) of paramount interest



# WS-SOA



- Web Services (WS) Service Oriented Architecture (SOA)
  - Reengineering e-Commerce applications
  - Services (part of business processes) as building blocks
- Open standards
  - World Wide Web Consortium (W3C)
  - Organization for the Advancement of Structured Information Standards (OASIS)
- Security related standards, e.g.
  - Cross-Enterprise Security and Privacy Authorization (XSPA)
  - WS-SecurityPolicy
  - WS-Trust



# Role Based Access Control (RBAC)



- Role-based access control (RBAC)
  - Constituting elements
    - S (subject, user, a person, an agent)
    - R (role)
    - P (permission)
    - SA (subject assigned to a role)
    - PA (permission assigned to a role)
    - RH (role hierarchy)
    - Session
      - User excercising roles
  - Could also be used to implement
    - Discretionary access control (DAC)
    - Mandatory access control (MAC)



#### NIST/INCITS 359-2004 RBAC



EQUIS

# AND BUSINESS

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#### WU

- WU ("vey-ouh")
  - "Vienna University of Economics and Business Administration", Vienna
  - About 27.000 students
  - Organized into 12 Departments
- Department of Information Systems
  - Four Institutes
    - Information Business
    - Production Management"
    - "Management Information Systems"
    - Information Systems and New Media







- Institute of "New Media and Information Systems"
  - Prof. Neumann, Prof. Strembeck
  - "learn@wu"
    - Lead-development of one of the largest and most intensively employed Web-based e-learning systems
      - Serving 27.000+ authorized participants
      - Hosting 4.600+ courses
      - Hosting 60.000+ learning resources







- "learn@wu"
  - Need for flexible, efficient management, hence role-based
    - Access to courses and learning resources
    - Adding, changing, removing courses and learning resources
      - Services sold outside of the University
      - Need for controlling access in a very flexible manner
    - Adding, changing, removing and conducting tests and student evaluations
      - For student's training purposes
      - For managing
- Research of RBAC
  - Prof. Strembeck



# WU RBAC-Research, Concepts

- Scenario-driven role engineering
  - Scenario-technique for deriving permissions and roles
    - Scenario, applicable for business processes as well
      - Possible or actual action and sequence of events
      - Each action/event in a scenario is a step which is associated with a particular access operation
      - A subject needs all permissions of all steps to carry out a scenario successfully
    - Task
      - Consists of one or more scenarios
    - Work profile
      - Consists of one or more tasks
      - May be used to derive a role



#### **Scenario-Driven RBAC**







# WU RBAC-Research, Concepts



- Engineer Context Constraints in RBAC environments
  - Conditional permissions are associated with context constraints
  - Context constraint
    - Clause containing one or more context conditions
  - Context attribute
    - A property of the environment (maybe a sensor to capture/measure)
  - Context function
    - A function to obtain the current value of a context attribute
  - Context condition
    - A predicate consisting of one operator and two or more operands



#### **Context-Sensitive RBAC**

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#### **Context-Driven RBAC**







# Scenario-Driven Role Engineering Process







# **WU RBAC-Research, Tools**



- Extended object RBAC (xoRBAC)
  - Concepts for engineering context constraints
  - XOTcl role based access control tool
    - Supporting
      - Principle of least privilege
      - Separation of duty (static, dynamic)
      - Definition of complex permissions
- Extended object role engineering tool (xoRET)
  - Scenario-based XOTcl role engineering tool
  - Engineering of context constraints











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Type:	Achieve		•	current time < end of exam
Author:	Mark Strembeck			
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Author: Mark Strembeck	<ul> <li>Export learning_resources</li> <li>Find_buddy</li> </ul>
Attached Scenarios	Show_new_resources Start_new_thread_in_discussion_group
Delete_learning_resource	
™ Export_learning_resources ™ Upload_new_exam ௺ Upload_of_new_learning_resource	upioaa_or_new_learning_resource
Remove Scenario from Task	Add Scenario to Task
Export_learning_resources     Upload_new_exam     Upload_of_new_learning_resource     Remove Scenario from Task  Options	Add Scenario to Task





tribute	s	Currently Available Tasks
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uthor:	Mark Strembeck	Course_specific_role_administration
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Conta		
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Cours Obse	se_specific_role_administration rve_course_specific_discussion_groups Remove Task from Profile	Add Task to Profile





Available Roles	Options	Direct Junior-Roles
당 AssistantProfessor 당 AssociateProfessor 당 DepartmentHead 당 FullProfessor 당 Guest 당 Lecturer	>> Assign Junior >>	₩ FullProfessor ₩ Lecturer
ë MasterStudent ë PhDStudent ë Reader ë Secretary	<< Revoke Junior <<	
		Inherited Junior-Roles
	<ul> <li>Assign Junior-Roles</li> <li>Assign Senior-Roles</li> </ul>	Wasterstudent WPhDStudent WReader Secretary
	Close	





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estination type:	Destination object:	
Objective	Secure_online_exams	
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#### **DRM and RBAC**



- Possible challenges
  - Employing RBAC concepts for more flexible and easier maintainable DRM tasks?
    - Concentrating on access (rights)
    - Abstract right to use to role based infrastructures
    - Individuals would only get access rights via assigned roles
    - Changing the technological security infrastructure may be insulated from the subjects, possibly avoiding some problems if DRM servers need to be put out of service
  - Creation of appropriate modelling tools?







