SHAREPOINT SERVER 2007 DEPLOYMENT FOR ELECTRONICS EDUCATION

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SharePoint Server 2007 is an integrated suite of server capabilities built on top of Windows SharePoint Services and it is a solution for improving the organizational effectiveness. The portal technologies enable universities to improve the efficiency and effectiveness of different activities, including communication and collaboration, document management, information access and sharing, and assessment and reporting by connecting their people, information and services. The team of the Technical University - Sofia R&D Laboratory "eLearning Technologies" is running a project aimed at developing and deploying of a learning portal that meets educational needs in electronics. It is based on the scalable learning platform based on Microsoft products and technologies: SharePoint Server 2007, SharePoint Services 3.0, SharePoint Learning Kit, Class Server and integrates originally developed Computer-Aided Learning Design System for SharePoint.

Keywords: SharePoint Server 2007, deployment, learning portal, IMS learning design, electronics education

1. INTRODUCTION

Improving education in electronics requires removing barriers and building connections by giving educators, researchers, students and administrators access to the people, information and services that they need to fulfill their role within the learning and research communities. Education in electronics today is comprised of three critical areas: facilitation, management and assessment of learning. Within each of these areas, myriad activities take place every day: 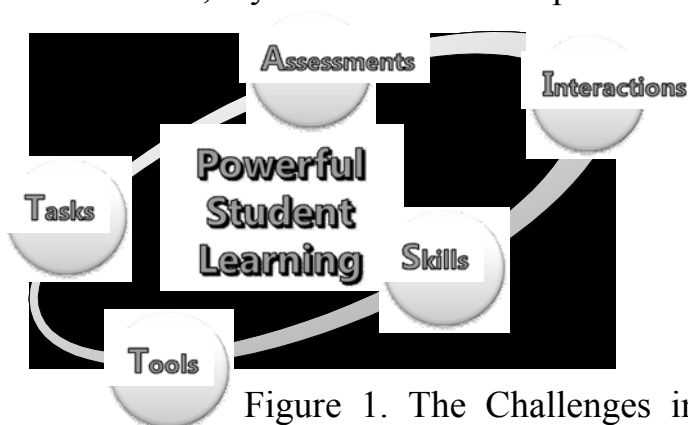tasks, assessments, interactions, skills and tools (Figure 1). Portals are solutions that enable universities to improve the efficiency and effectiveness of different activities, including communication and collaboration based on Web 2.0, document management, and information access and sharing, and assessment and reporting by connecting their people, information and services.

Figure 1. The Challenges in Electronics Education

This paper describes the main achievements of a currently running project at the R&D Laboratory "eLearning Technologies" aimed at developing and deploying of a

learning portal that meets educational needs in electronics today and prepares it to adapt to the needs of tomorrow. The built learning portal is based on Microsoft products and technologies: SharePoint Server 2007, SharePoint Services 3.0, SharePoint Learning Kit, and Class Server. The new authoring instrument for computer-aided learning design is developed and presented as an integral part of the learning portal.

2. POSSIBILITIES OF INTEGRATED PRODUCTS AND TECHNOLOGIES

The learning portal for education in electronics meets the various needs in the following ways: giving users a single point of access to information stored across different systems, providing all services through a Web browser with a single sign-on from anywhere on the Internet, setting up role-based access to information for students, educators, and administrators, helping teams work together efficiently.

Also, it offers simple-to-use productivity tools for students and educators, integrating student information, grades and other content securely and simply, enabling the delivery of students' assessments, supporting standards (including SCORM and IMS Learning Design), providing a framework for integrating other Microsoft components and third-party applications.

The new Microsoft technologies used in the project are:

• **Microsoft SharePoint Server 2007** is an integrated suite of server capabilities built on top of Windows SharePoint Services. It helps improve organizational effectiveness by providing comprehensive content management and enterprise search, accelerating shared business processes, and facilitating information-sharing across boundaries for better business insight. SharePoint Server 2007 provides information technology professionals and developers with the platform and tools they need for server administration, application extensibility, and interoperability. Additionally, IT professionals benefit from one integrated platform that supports intranets, extranets, and Web applications across an enterprise, instead of relying on separate fragmented systems [1].

• **Windows SharePoint Services 3.0** is a technology that enables users to collaborate in browser-based workspaces while providing a manageable infrastructure and extensible application platform for improving the efficiency of learning processes [2]. The benefit from the enhanced collaboration and productivity enabled by Windows SharePoint Services are: increased team productivity and access to the people, documents, and information they need, tactical implementation of collaboration tools, control over and security of data, creating rich and scalable Web-based applications.

• **Microsoft SharePoint Learning Kit (SLK)** is an eLearning delivery and tracking application. It is the tool that lets educators create an assignment out of any document in a SharePoint Document Library. SharePoint Learning Kit is integrated with SharePoint Server 2007 and has the following features: supports SCORM 2004, SCORM 1.2, and Microsoft Class Server content, allowing users to store and manage this content in SharePoint document Allows assignment delivery, tracking, and

grading for Microsoft Office documents, media files, PDF files, and other documents in a SharePoint document library [3].

- **Microsoft Class Server** is a learning management platform for delivering assessments and lessons over the Web. Class Server enables educators to track and improve student achievement against local curriculum standards.

- **Computer-Aided Learning Design System for SharePoint** is originally developed in R&D Laboratory "eLearning Technologies" author instrument complied with IMS Learning Design conceptual model aimed at automating and supporting educators in their learning design process. The model presents activities, content, tools and workflow for learners and staff to accomplish one or more learning objectives.

3. LEARNING PORTAL DEPLOYMENT FOR EDUCATION IN ELECTRONICS

The proposed Electronics Learning Portal site template contains the site definition files for the following components: Curricula in Electronics, Courses, Educators, Students, Groups, Staffroom, and Collaboration sites, set in the hierarchy shown in the Figure 2.
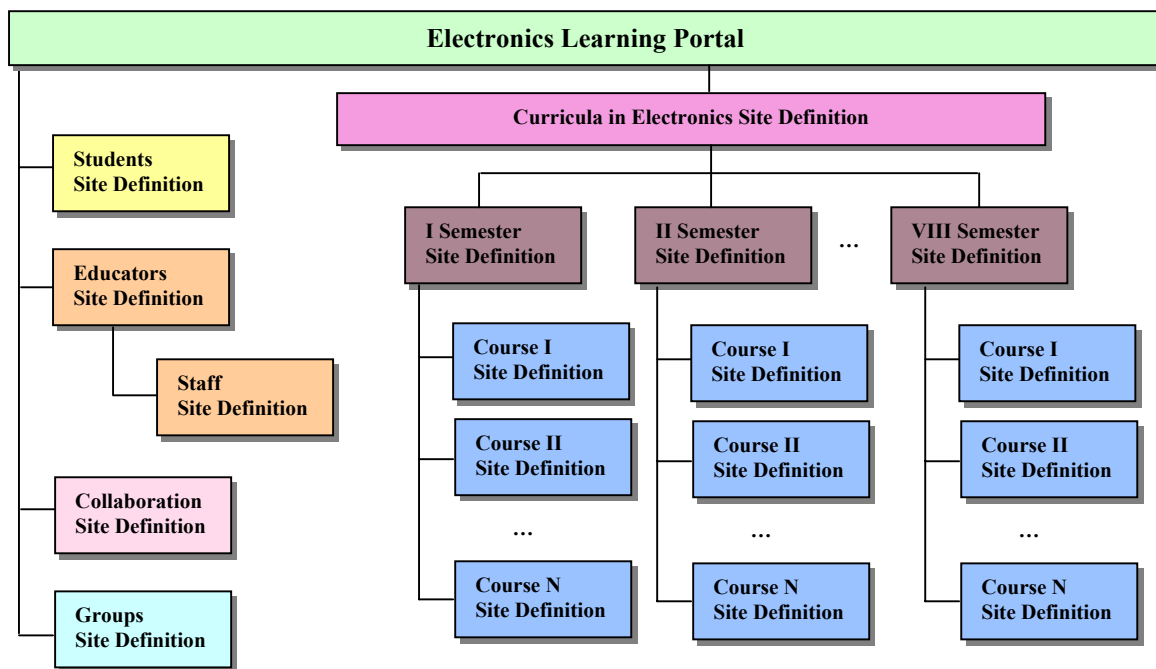

Figure 2. Curricula in Electronics Portal Site Definition

The technical architecture of learning portal for electronics education with components, services and technologies is presented on Figure 3. The architecture is realized on Microsoft Office SharePoint Server 2007 as platform based on ASP.NET 2.0 technologies and it includes components for basic services and additional functional components as solutions for learning design and content creation and

management, for searching, for workflow management, for collaboration and communication, and other.

Web Browser

Interfaces (based on AJAX, DHTML, RSS, XML Web Services) User: Security, Navigation, Services, Mashup Applications: XML Web services; Syndication: RSS

Applications and Services

Collabo-ration Doc Collab, Wiki, Blog Discussion Contacts Tasks Email Offline Lists	**Portal** Intranet Template Announcem., Directories, My Sites, People Finding, Social Networking Privacy	**Search** Search center, Data Search, Metadata scalibility	**Learning Design** Authoring Workflow Metadata Roles Activities Environm. Method	**Content Manag.** Authoring Workflow Web publishing Document Managm., Record Managm. Multi-Languages	**Business Processes** Web Forms Self-service Forms LOB integration LOB Actions Pluggable SSO	**Business Manag.** Excel Services, Report Center Data in Records SQL RS/AS integration

Storage Repository Metadata Versions Backups Recycle bin	**Security** Policies Pluggable AuthN Folder/Item Level Rights	**Management** Admin UX Delegation Delivery Tracking	**Deployment** Migration Farm Services Policies	**Site Model** Templates Rendering Navigation Comforma-bility	**Extensions** Forms/Fields OM and SOAP Events API migrat.

Operational System Services

ASP.NET: web parts, personalization, master pages, delivery, security

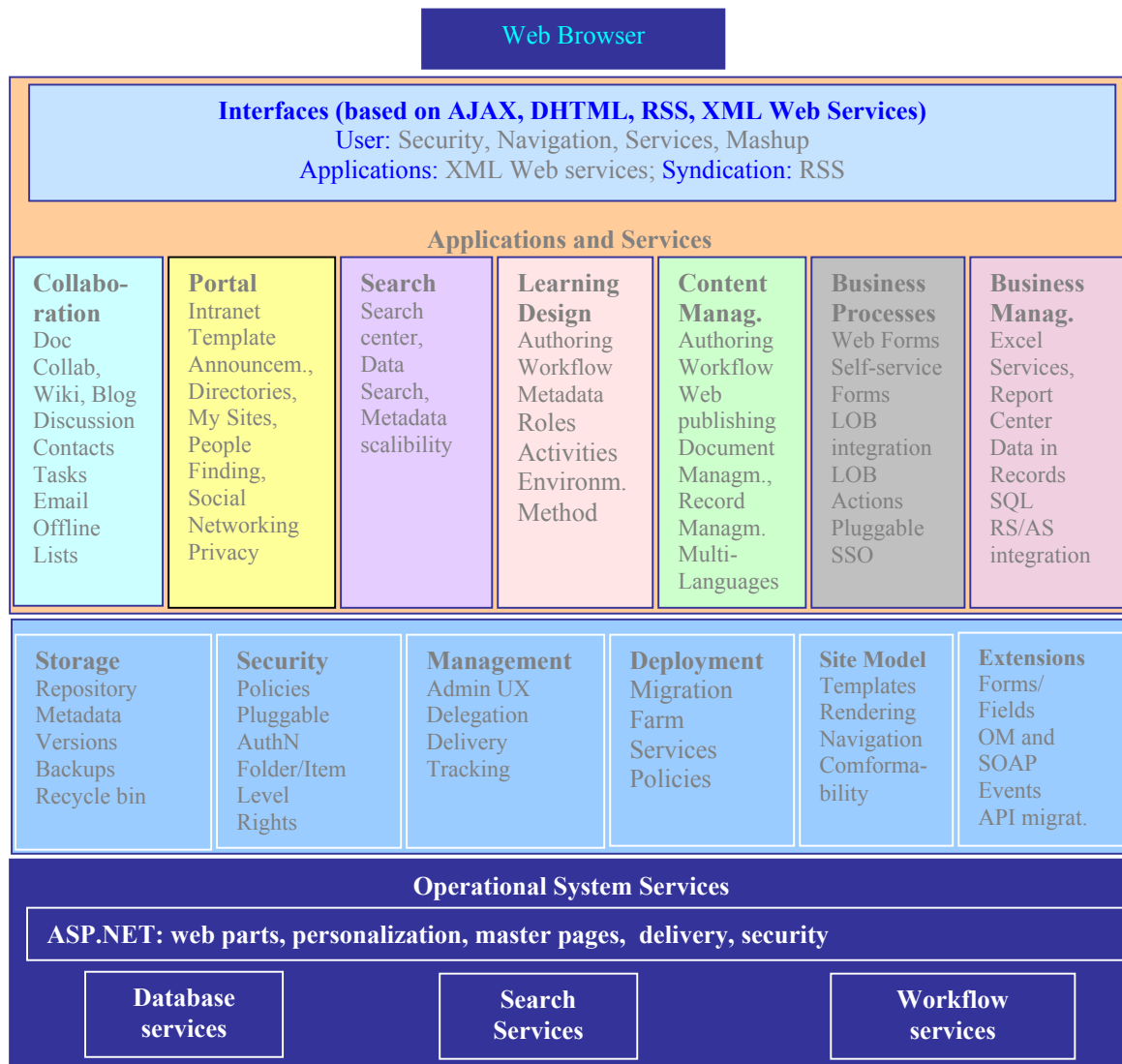| **Database services**	**Search Services**	**Workflow services**

Figure 3. Technical Architecture

The learning portal is composed of different Microsoft server products, plus the custom components especially created for the education solution.
On Figure 4 is presented client-server architecture. The main servers' features and workflows include: Internet Security and Acceleration (ISA) Server is the gateway to the rest of the servers, ISA Server intercepts any request sent to access any of the servers deployed in the learning portal, a client attempts to access the learning portal using the portal's URL; ISA Server on the other side receives and forwards the request to the SharePoint Server 2007; a client wants to directly access Outlook Web Access (OWA) to check his Inbox. The client uses the OWA URL; ISA Server on the other side receives and forwards the request to the Mail Server; ISA Server communicates internally with the Mail Server using inside the portal; The SharePoint Server communicates with SQL Server to store and retrieve data.
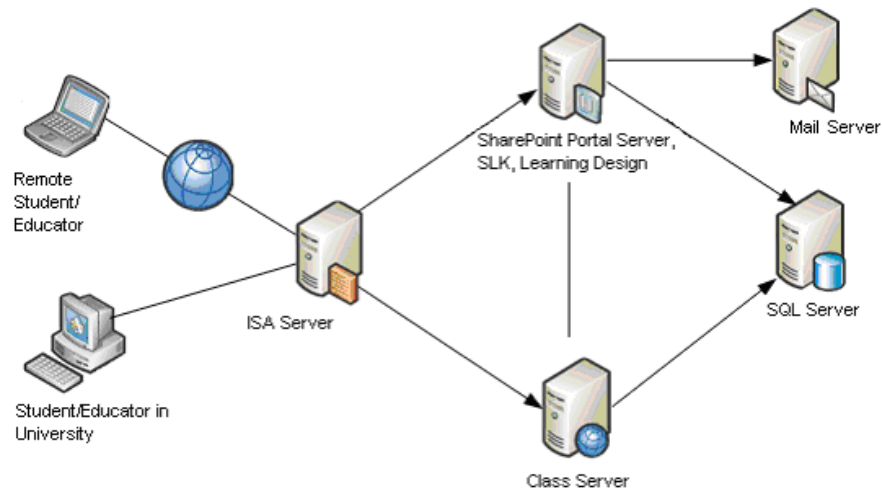
Figure 4. Client-Server Architecture

4. LEARNING DESIGN FOR SHAREPOINT

The Microsoft SharePoint Learning Kit as an e-learning delivery and tracking application has the following core features: supports SCORM 1.2, SCORM 2004, and Class Server content, allowing users to store and manage this content in SharePoint document libraries; supports a learner-centric or instructor-led (assigned) workflow; allows assignment, tracking and grading of both e-learning and non-e-learning content. The SharePoint Learning Kit could be used by educators to assign and grade assignments for their students or groups, but in SLK is not possible to be built accomplished scenarios including roles, activities, activity structures, environments in order to be achieved learning objectives [5].
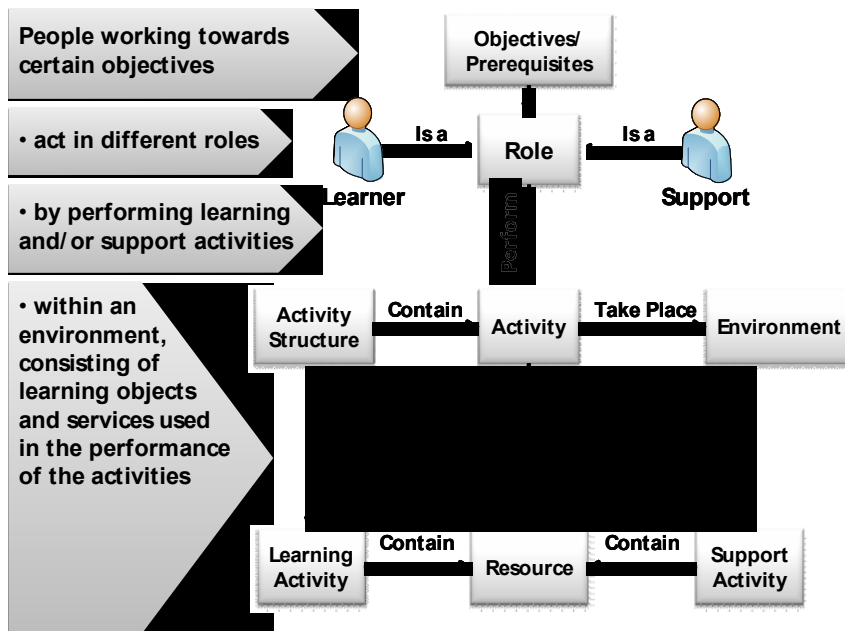
For increasing the quality of the eLearning courses and to improve their efficiency, and effectiveness in electronics education the Computer - Aided Learning Design System for SharePoint has been originally developed. The Authoring System is based on IMS Learning Design conceptual model for the description of teaching and learning processes (Figure 5).

Figure 5. IMS Learning Design as a Stage-play Metaphor

The IMS Learning Design implementation for SharePoint is presented on Figure 6.
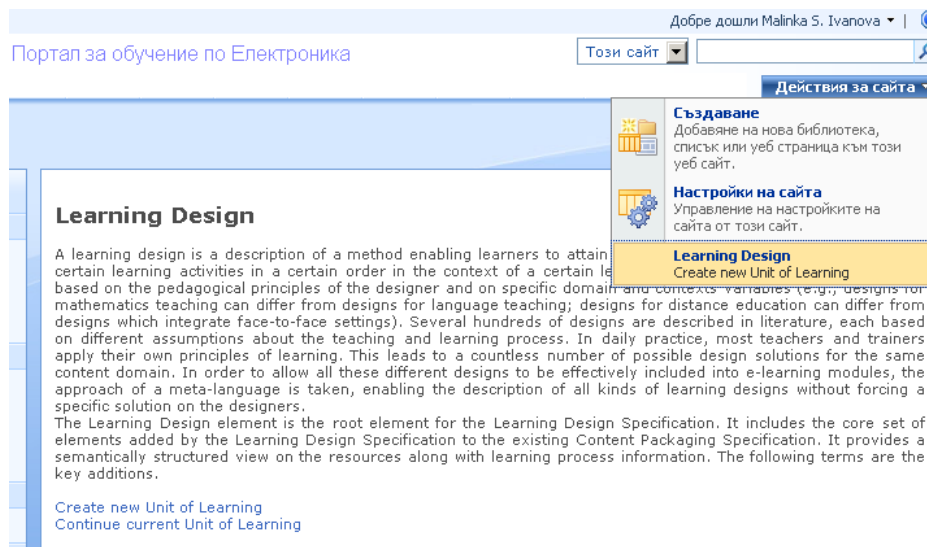

Figure 6. Learning Design for SharePoint Implementation

5. CONCLUSION

In this paper the SharePoint Server 2007 deployment is presented in case of learning portal for electronics education implementation. The learning portal is a powerful learning environment that enables the educators/students throughout higher education to share information and work together on projects from a single point of access, the place that provide people with self-service access to complete processes for admissions, recruitment, assessment, reporting, scheduling, and grading.

The possibilities of Microsoft products and technologies have been explored and discussed. The model of the learning portal site collections has been designed consists of the following components: Electronics Curricula site definition, Students' site definition, Educators' site definition, Collaboration site definition, People and Group site definition. The technical and client-server architectures of the learning portal have been developed. The new authoring instrument for computer-aided learning design has been developed and presented as an integral part of the learning portal.

6. REFERENCES

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