

The Next Generation Web E-speak and E-services

Michael B. Spring
Department of Information Science and Telecommunications
University of Pittsburgh

spring@imap.pitt.edu
<http://www.sis.pitt.edu/~spring>
<http://bazaar.sis.pitt.edu/>

Acknowledgement

These slides are designed to provide an orientation to e-speak. They were developed at the University of Pittsburgh for students in various courses who are coming to grips with the e-speak engine and API.

We would like to acknowledge the support of HP in the development of this effort. The ideas expressed in the slide set are those of the author and do not imply the endorsement or concurrence of Hewlett-Packard.

Context

- This presentation is designed to help people develop a fundamental understanding of e-speak.
- The presentation relies on a sample project defined for students at the University of Pittsburgh consisting of a loosely coupled set of instructional services managed in a e-speak context.
- The particular project was selected because it required minimum student orientation. At the same time, the design is consistent with a help desk or a knowledge management system.

September 28, 2001

E-speak

3

Motivation

- Over the initial trial period, we struggled with issues of terminology, architecture, and implementation strategies
- This presentation is a companion to the earlier “Introduction to e-speak” and highlights some important learnings including:
 - The n-tiered nature of the model
 - The importance and ease of defining interfaces
 - The difficulty of defining vocabularies
 - The difficulties in defining service conceptualization

September 28, 2001

E-speak

4

Overview

- Introduction
- Getting started
 - What e-speak does
 - A mind set
- Envisioning the project
- Implementing the project
 - Vocabulary issues
 - Interface issues
 - Components and mechanics
- Next steps – marketplace services revisited

September 28, 2001

E-speak

5

Getting Started

- Which to talk about first
 - Technologies in search of new opportunities
 - Problems in search of new solutions
- E-speak – conceptually
 - A service server
 - A distributed system
- Identifying a task – conceptually
 - Distributed resources
 - Classes of similar services
 - Micro-transactions/services

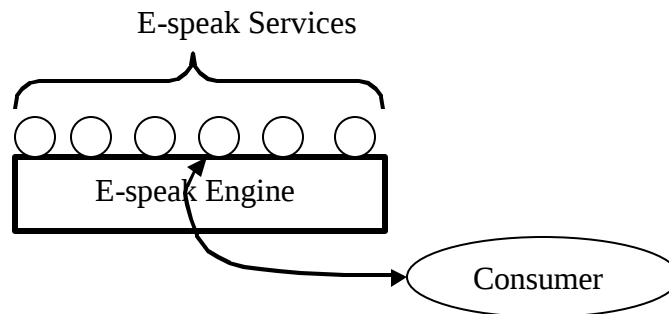
September 28, 2001

E-speak

6

What is E-speak (1)

- E-speak is a component transaction monitor



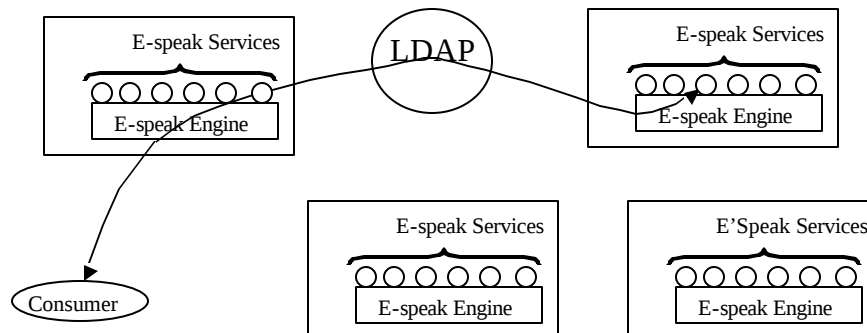
September 28, 2001

E-speak

7

What is E-speak (2)

- E-speak is a distributed service



September 28, 2001

E-speak

8

What is E-speak (3)

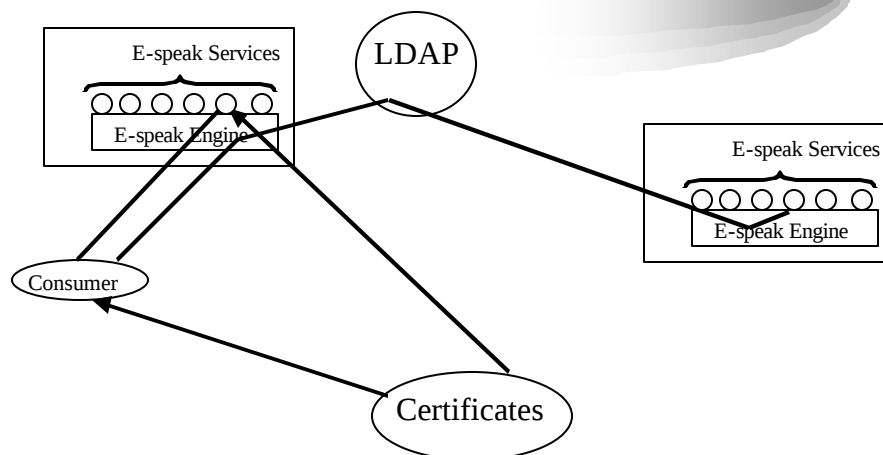
- E-speak is a system that provides support for:
 - Advertising and finding based on vocabularies
 - Authentication
 - Multiple access methods
 - Security

September 28, 2001

E-speak

9

E-speak Advertising and Authentication

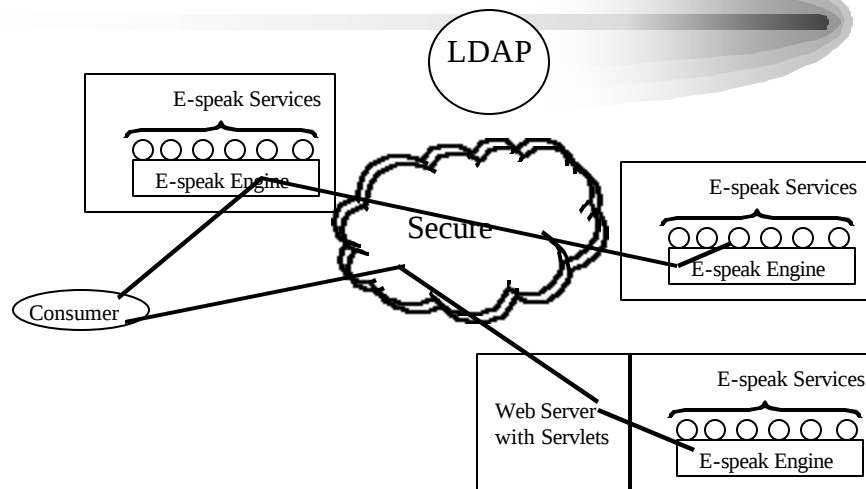


September 28, 2001

E-speak

10

E-speak Access and Security



September 28, 2001

E-speak

11

What is E-speak (4)

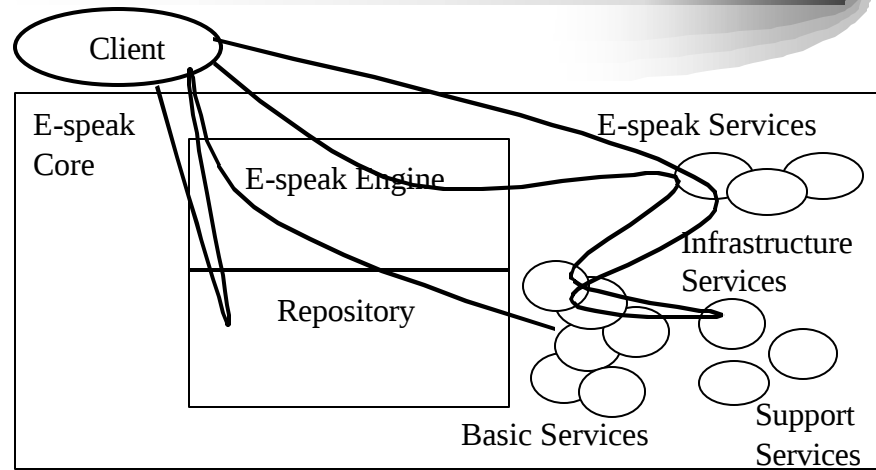
- E-speak is an extensible system with decentralized control:
 - Vocabularies
 - Attributes and values
 - Combined and advertised
 - Services
 - Atomic services
 - Infrastructure services
 - Support services

September 28, 2001

E-speak

12

Vocabularies and Metaservices



September 28, 2001

E-speak

13

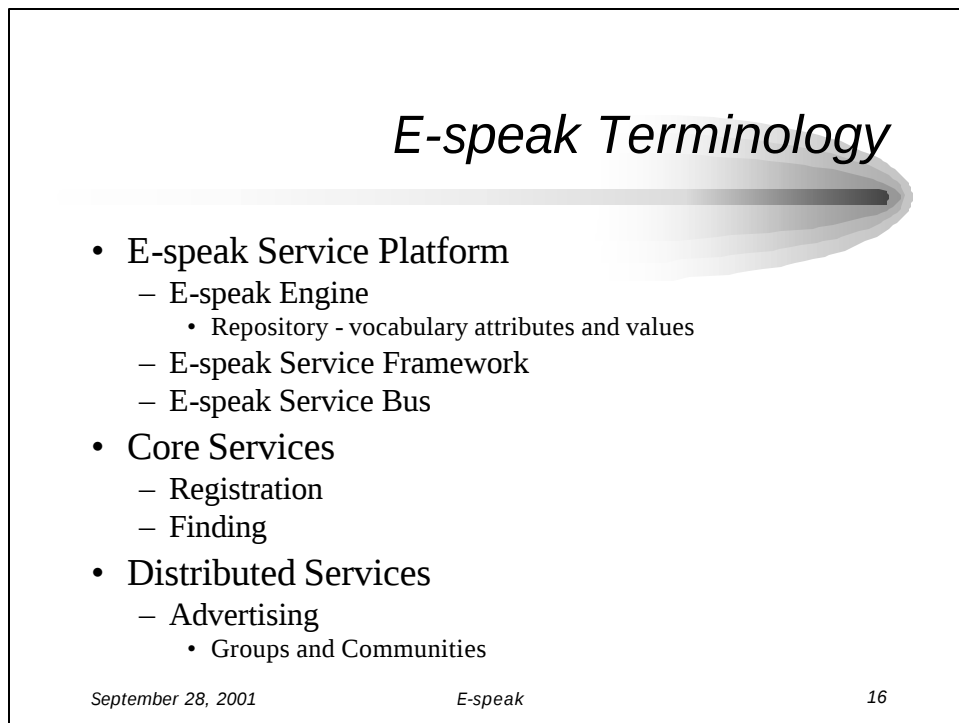
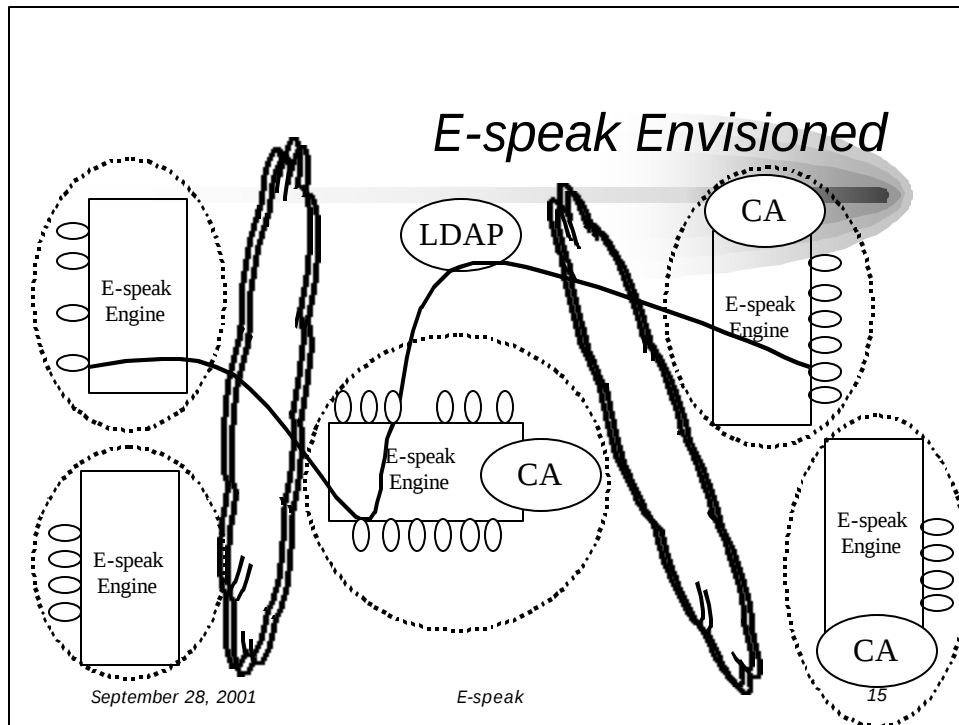
A Mind Set

- Millions of machines
- Marketplace makers
- Competing service providers
- Dynamic offerings
- Distributed certificate authorities
- Intermediaries
- Smart devices
- “Smart” consumers

September 28, 2001

E-speak

14



How Standards fit in

- Transmission protocols(http, smtp)
- Envelope protocols(SOAP)
- Message protocols(EDI, BizTalk)
- Conversation protocols(UDDI, SFS)
- Marketplace Conventions
- The role of XML

September 28, 2001

E-speak

17

A Vision for this Project

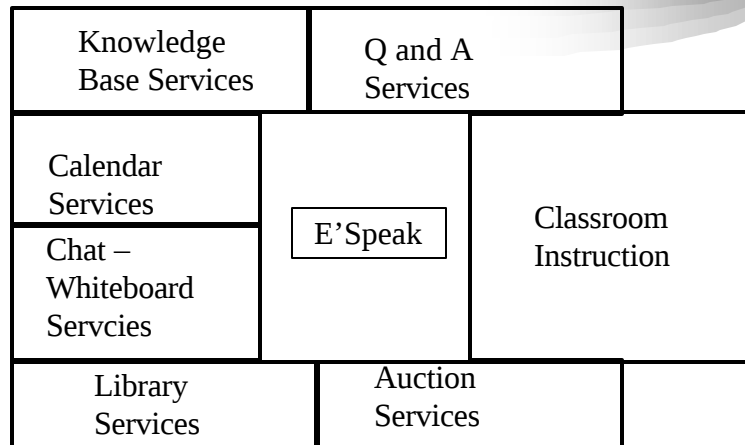
- Nature of the marketplace
 - Micro transactions
 - Micro services
 - Composable and malleable services
- Creating a new marketplace
 - Students and their expertise
 - Artifacts and their value
 - Holes in the fabric of conventional instruction
- The support of the market
 - Transaction monitoring
 - Authentication and authorization
 - Currency and Payoff

September 28, 2001

E-speak

18

Functional Picture of the Vision

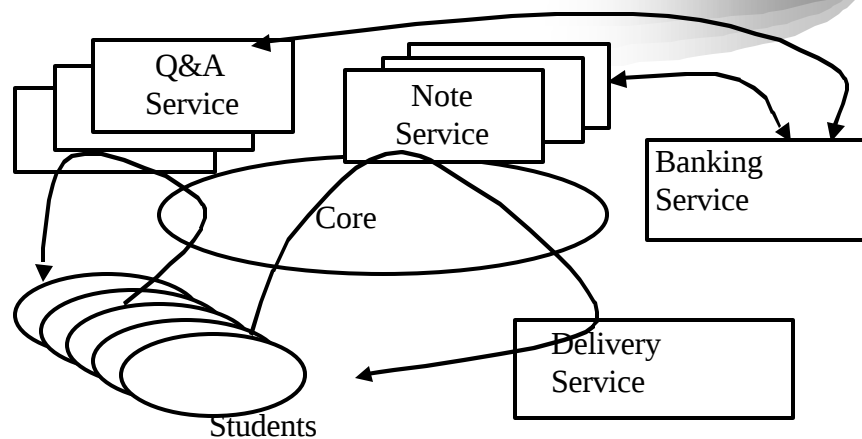


September 28, 2001

E-speak

19

Structural Picture of the Vision



September 28, 2001

E-speak

20

Setting up the Project

- Building a Vision
 - Establishing the vision
 - Communicating the vision
 - Implementing the vision
- Establishing Roles
 - Architect
 - Designers
 - Coders
 - Users

September 28, 2001

E-speak

21

Project Terminology

- The Marketplace
 - Marketplace services
 - Infrastructure services
 - Basic services
- Consumer program
 - User interface
 - Service interfaces
- Producer programs and basic services
 - Placeholder and interactive service
 - Service interfaces

September 28, 2001

E-speak

22

Clarifying Assumptions

- There will be sets of services
 - The services will have identical interfaces
 - They will differ in terms of attribute value pairs
- Consumer side software will be available
 - Signed jars or applets will be downloaded by users in order to access the services
- Vocabularies will be known either through web services or consumer software

September 28, 2001

E-speak

23

Simplifying Assumptions and Mechanics

- Simplifying Assumptions
 - No WAP
 - No appliances
 - No WEB
- Overcoming the interface issue
 - Producer programs
 - Thin Clients

September 28, 2001

E-speak

24

Design Steps (high level)

- The vocabulary
 - Attributes and values
- The Interfaces
 - Objects and methods
- Infrastructure Services
 - Authentication and authorization
 - Banking
- Support Services
 - Translation services
 - Rating services
- Consumer Programs
- Service Producer Programs

September 28, 2001

E-speak

25

Vocabulary Design

- Single or multiple vocabularies?
- Size of the vocabulary
- Attributes/Value ratio
 - Many attributes, few values
 - Few attributes, many values
- Nature of the values
 - Finding data
 - Dynamic data assessing services (rating)

September 28, 2001

E-speak

26

Components

- Marketplace services
- Infrastructure services
- Basic Services (producer programs)
 - Individual services
 - Routing services
- Consumers
 - Signed Jar files
 - Thin clients

September 28, 2001

E-speak

27

Basic Services: Producer Components

- A basic service is a piece of software designed to provide some service.
 - It may use other services in the marketplace.
 - The particular service may be established by a generalized piece of software that attaches as a specific remote service when run – differentiated by vocabulary
 - It may be a piece of software that writes code that makes a differentiated service when run
 - It may be a web server application (CGI) that creates and spawns a basic service

September 28, 2001

E-speak

28

Consumer components

- The consumer program provides
 - A connection to a core
 - A mechanism for user input and selection to allow
 - Service finding and selection
 - Service execution
- Consumer programs
 - May be written to conform to a published interface
 - May be available for download from the web
 - May be integrated into some single package
 - May provide support for automated updating

September 28, 2001

E-speak

29

Interfaces and Objects

- Initially we worked to define our interfaces in terms of DBMS needs and functionality.
- ESIDL was not seen as the important mechanism it is until too late
 - ESIDL allows the use of javadoc which allows both clear documentation about the interface and the functionality
 - ESIDL automatically incorporates object serialization

September 28, 2001

E-speak

30

A Sample ESIDL File

```
/**
 * BankingServiceIntf is one of Banking Service's interfaces. Acting as a back office, this interface provides methods for Service Brokers such
 * as QAService, NoteService and RatingService. @author Ganokporn Rungritampanya @version %I%, %G% @since JDK1.2.2 */
import net.espeak.jesi.ESService;
import net.espeak.infra.cci.exception.EServiceException;
import net.espeak.infra.cci.exception.EInvocationException;
import java.sql.*;
import java.util.*;
public interface BankingServiceIntf extends ESService {
    /**
     * Transfers money from one account to another.
     * @param fromAccId The account from which the money is transferred.
     * @param toAccId The account to which the money is transferred.
     * @param transAmount The amount to be transferred.
     * @param serviceName The broker, QAService or RatingService, who call the method.
     * @return <code>refNo </code> if the transfer is done successfully;
     * <code>an error code</code> otherwise. Error code example:<ul><li>-401 Receiver account not found,
     * <li>-102 Sender account not found,<li>-201 Receiver account closed,<li>-202 Sender account closed <li>-300 Not enough balance. </ul>
     * @exception <code>EServiceException</code> If an invocation exception occurred.
     * @exception <code>BankException</code> If a bank exception occurred. */
    public int fundTransfer(String fromAccId, String toAccId, float transAmount, String
        serviceName) throws EServiceException, BankException;
}
```

September 28, 2001

E-speak

31

Related Javadoc



September 28, 2001

E-speak

32

Related Javadoc (continued)



September 28, 2001

E-speak

33

Next Steps

- Having defined a series of interfaces and functionality, a basic marketplace can be set up.
- The next question is what would it take to make this a useful marketplace
- The basic services envisioned included:
 - Question and answer service
 - Notes service
 - Calendar service
 - Collaboration service
 - Auction service

September 28, 2001

E-speak

34

Q&A Service, Cut 1

- First cut, the Q&A service is a simple service
 - Register an expertise, hold a live connection
 - Search for expertise
 - Select an expert and dispatch question
 - Collect answer and return it to consumer
 - Provide some accounting for the transaction

September 28, 2001

E-speak

35

Q&A, Management

- **Service hours and operation** – start the service such that it offers multiple contact options. For example, closed, mail contact, open for interactive business, emergency paging service.
- **Selection and Bidding** – allow the consumer to ask experts to bid on the question.
- **Billing** – billing was initially fixed price. The system could be enhanced to use time, length of answer, etc.

September 28, 2001

E-speak

36

Q&A, Options

- **Submission and Response Options** – will we allow multiple answers to one question, or would the first expert to respond be the only one to be linked? Who will be paid?
- **Reminders** – provide experts with mail reminders of questions that may need to be answered
- **Store & Forward** – if questions are answered when the questioner is away, the system must save the answer and deliver it when the questioner returns. Similarly if a question applies to one particular expert (and no other experts are available) the system must save that question and notify the expert when he/she becomes available

September 28, 2001

E-speak

37

Notes Service, Cut 1

- First cut, the notes service is a simple
 - Register an document
 - Search for a document
 - Deliver the document
 - Provide some accounting for the transaction

September 28, 2001

E-speak

38

Notes, Delivery Monitoring

- Delivery monitoring is a marketplace service that might provide a number of different function
 - It could serve as a timer for documents that are streamed allowing billing by the minute
 - It could monitor interactive question and answer sessions allowing billing based on time or traffic
 - It could be used in chat-rooms to establish charges based on time or traffic
 - It could monitor usage of a knowledge base to credit accounts

September 28, 2001

E-speak

39

Notes, Transformation

- The transformation service might be used to convert documents or dialogs from one form to another
 - It might select the right document form out of a library to meet bandwidth needs of a connection.
 - It might provide services to aid in the conversion of submitted documents to a form suitable to subsequent transformation
 - It might use XSLT to transform XML documents for a form right for the connected device

September 28, 2001

E-speak

40

Notes, Rating Services

- A rating service would be used to create meta services that would provide additional value to service consumers
 - The finder service might be enhanced to identify services by vocabulary and then refine the selection based on ratings
 - Contributors to a document library might receive feedback on the usefulness of there documents
 - Calendaring options might use the rating service to collect assessments of the possible time for a meeting

September 28, 2001

E-speak

41

Marketplace Components

- Authentication – determine if a given individual is allowed to start a service of this type, or use one
 - Automation or simplification of the CA capability
- Accounting – the marketplace might also have accounting functions
 - A surcharge to services for registration
 - A mechanism for anonymous assessment of funds transfers
- Rating – the marketplace might serve as the locus for service assessment
 - Quality assurance
 - Collaborative assessment

September 28, 2001

E-speak

42

Concluding Remarks

- E-speak and E-Instruction are foreign territory
- What is proposed is a new kind of service & marketplace
 - Wrapped around traditional instruction
 - It is to act as a marketplace
- Opportunities to develop the idea will become apparent as the system becomes more concrete:
 - Primitive, composed, & marketplace services
 - Web and WAP services
 - Better vocabularies

September 28, 2001

E-speak

43