SHARING TELEMATICS COURSES
THE CANDLE PROJECT

Aiko Pras
Centre for Telematics and Information Technology (CTIT)
University of Twente (UT)
The Netherlands

http://www.home.ctit.utwente.nl/~pras

PRESENTATION AT THE EUNICE 2001 SUMMER SCHOOL
PARIS, FRANCE, 4 SEPTEMBER 2001
OVERVIEW

• COURSE DELIVERY IN THE FUTURE
• ABOUT THE CANDLE PROJECT
• OPEN COURSEWARE SERVICE
• OPEN COURSEWARE COMPONENTS
  - FOUNDATIONS OF TELEMATICS
  - INTERNET MANAGEMENT PROTOCOLS
• METHODS TO GUIDE AUTHORS & TEACHERS
OVERVIEW

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    - INTERNET MANAGEMENT PROTOCOLS
  • METHODS TO GUIDE AUTHORS & TEACHERS
TRADITIONAL WAY OF TEACHING

• NOTES ON THE BLACKBOARD
• INTRODUCTION OF READERS
• SOME OF THEM BECAME BOOKS
• AROUND 10 BOOKS PER SUBJECT
LIMITATIONS

- LIMITED COLLABORATION BETWEEN AUTHORS / TEACHERS

- NO MULTI-MEDIA FACILITIES

- NO ANIMATION

- NO INTERACTIVE EXERCISES
WHAT THE FUTURE WILL BRING :-)  

- COLLABORATION BETWEEN AUTHORS / TEACHERS
  - MULTI-MEDIA / ANIMATION / INTERACTION
  - WEB MATERIAL
  - MAINTAINED BY MANY TEACHERS / AUTHORS
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ABOUT CANDLE ...

http://www.candle.eu.org/

EUROPEAN PROJECT
IST 5TH FRAMEWORK PROGRAM

START: JUNE 2000
DURATION: 3 YEARS

• TOTAL COSTS: 3.281 (2.391) MEURO
  • TOTAL FTE: 30.2
  • FTE 2001: 10.7
CANDLE PARTNERS

Universität Karlsruhe (DE), *PROJECT COORDINATOR*
British Telecommunications (UK)
École Nationale Supérieure des Télécommunications de Bretagne (FR)
Norwegian University of Science and Technology (NO)
University of Twente (NL)
Institut National des Télécommunications (FR)
Institute of Education (UK)
Politecnico Turino (IT)
Suffolk College (UK)
University College London (UK)
Universitat Politècnica de Catalunya (SP)
Universität Stuttgart (DE)
CANDLE GOALS

1) PROVISIONING OF AN OPEN COURSEWARE SERVICE

2) CREATION OF OPEN COURSEWARE COMPONENTS

3) DEVELOPMENT OF METHODS TO GUIDE AUTHORS & TEACHERS
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OPEN COURSEWARE SERVICE

TO IMPROVE THE QUALITY OF COURSE MATERIAL

AND REDUCE DEVELOPMENT COSTS

BY SHARING AND REUSING MATERIAL VIA THE WEB
OPEN COURSEWARE SERVICE

Author
enter new material / improve existing material

Teacher
select material

Student
enter material
follow course

CANDLE service
CANDLE courseware repository

Delivery systems
MATERIAL WITHIN THE REPOSITORY

- SIMPLE SLIDE
- SET OF SLIDES
  - FIGURES
  - ANIMATIONS
  - WEB PAGES
  - APPLETS
  - MOVIES
  - ...

FINE GRANULARITY: INTRODUCTORY COURSES
COARSE GRANULARITY: ADVANCED COURSES
SELECTING MATERIAL

META DATA
• DESCRIPTION
• NAME OF AUTHOR
• CONTACT INFORMATION OF AUTHOR
• LANGUAGE
• LOCATION (URL)
• FORMAT (MIME TYPE)
  • ...

XML
SEPARATE FILES
ALWAYS IN CENTRAL REPOSITORY
PROVISIONING TIME PLAN

CANDLE members

EUNICE members

rest of the world
OVERVIEW

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  - FOUNDATIONS OF TELEMATICS
  - INTERNET MANAGEMENT PROTOCOLS
• METHODS TO GUIDE AUTHORS & TEACHERS
OPEN COURSEWARE COMPONENTS

- FOUNDATIONS OF TELEMATICS
  - INTERNET PROTOCOLS
    - MIDDLEWARE
    - NETWORK MANAGEMENT
  - INTERNET MANAGEMENT PROTOCOLS
    - NETWORK SECURITY
    - ROUTING ALGORITHMS
    - ACCESS NETWORKS
      - LANS
    - MOBILE COMMUNICATIONS
  - MATHEMATICAL METHODS FOR TELEMATICS
    - FORMAL METHODS FOR TELEMATICS
      - CODING THEORY
      - INFORMATION THEORY
FOUNDATIONS OF TELEMATICS

INTRODUCTORY COURSE

TOPICS:

- COMMUNICATION NETWORKS
- DISTRIBUTED SYSTEMS
- INTELLIGENT NETWORKS
- CODING
- TELE-TRAFFIC THEORY

EACH TOPIC IS FURTHER DIVIDED INTO SUB TOPICS

SET OF POWERPOINT SLIDES PER SUB TOPIC
HOW IS IT (CURRENTLY) STORED WITHIN THE REPOSITORY
CONTENTS:

• INTRODUCTION
• STRUCTURE OF MANAGEMENT INFORMATION (SMI)
  • MANAGEMENT INFORMATION BASES (MIBS)
• SIMPLE NETWORK MANAGEMENT PROTOCOL (version 1, 2 & 3)
  • DISTRIBUTED MANAGEMENT
  • EXTENSIBLE AGENTS
  • REMOTE MONITORING

± 250 SLIDES (PDF)

± 20 VIDEOS (± 10 HOURS, REAL / …)

INTERACTIVE EXERCISES

• MANAGEMENT INFORMATION (MIBS)
• SIMPLE NETWORK MANAGEMENT PROTOCOL (SNMP)
MIBs - EXAMPLE OF QUESTIONS

WHEN (DAY & TIME) WAS THE LAST RESET OF (THE MANAGEMENT PORTION OF) THE HP LASERJET?

HOW MANY INTERFACES (EXCLUDING THE LOOPBACK) HAS THE CABLETRON ROUTER?

WHAT IS THE SPEED (IN MBPS) OF THESE INTERFACES?

WHAT IS THE MAC ADDRESS OF THE INTERFACE THAT RECEIVED MOST ERRORS?

WHAT IP ADDRESS BELONGS TO THAT INTERFACE?
MIBs - INFRASTRUCTURE

Student

Delivery system

WEB-BROWSER

HTTP / HTML

APACHE WEB-SERVER

PHP SCRIPTS

NET-SNMP

SNMP

ROUTER ETC.
The MIBs

Legend
HTML: the left side of the screen presents the MIB navigation tree. You can click on nodes to expand / collapse the tree. The right side shows the definition of the selected MIB object.
Module: the MIB module, which might have been changed to remove possible errors.
Original module: the MIB module, as extracted from the RFC.
SMing: MIBs in SMing structure.
XML (smi ng): MIBs represented in SMing structure, XML-encoded. This form is currently under discussion by the IRTF-NMGR.
XML (smi v2): MIBs represented in SMIV2 structure, XML-encoded.
RFC: the RFC the MIB module was extracted from.
MIBs - SCREENSHOT 2

Select device to test:  
- HP LaserJet 4050 TN
- Cabletron 2000 (router)
- Cisco ags-plus (router)
<table>
<thead>
<tr>
<th>ifIndex</th>
<th>ifDescr</th>
<th>ifType</th>
<th>ifMtu</th>
<th>ifSpeed</th>
<th>ifPhysAddress</th>
<th>ifAdminStatus</th>
<th>ifOperStatus</th>
<th>ifLastChange</th>
<th>ifInOctets</th>
<th>ifInUcas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Physical</td>
<td>ethernetCsmacd</td>
<td>1500</td>
<td>10000000</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>up</td>
<td>88:23:12:34:00</td>
<td>1531499409</td>
<td>7560569</td>
</tr>
<tr>
<td>2</td>
<td>Physical</td>
<td>ethernetCsmacd</td>
<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>down</td>
<td>65:23:34:12:00</td>
<td>3007402828</td>
<td>3994203</td>
</tr>
<tr>
<td>3</td>
<td>Physical</td>
<td>ethernetCsmacd</td>
<td>1500</td>
<td>10000000</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>up</td>
<td>19:23:21:35:00</td>
<td>1620122291</td>
<td>2433505</td>
</tr>
<tr>
<td>4</td>
<td>Physical</td>
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<td>1500</td>
<td>10000000</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>up</td>
<td>65:20:54:15:00</td>
<td>164427979</td>
<td>837965</td>
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<td>5</td>
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<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>down</td>
<td>19:23:12:24:00</td>
<td>191075747</td>
<td>414008</td>
</tr>
<tr>
<td>6</td>
<td>Physical</td>
<td>ethernetCsmacd</td>
<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>down</td>
<td>0:0:00:00:00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>Physical</td>
<td>ethernetCsmacd</td>
<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>down</td>
<td>0:0:00:00:00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>Physical</td>
<td>ethernetCsmacd</td>
<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>down</td>
<td>0:0:00:00:00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>Physical</td>
<td>ethernetCsmacd</td>
<td>1500</td>
<td>10000000</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>up</td>
<td>17:05:30:30:00</td>
<td>6792528</td>
<td>75256</td>
</tr>
<tr>
<td>10</td>
<td>Physical</td>
<td>ethernetCsmacd</td>
<td>1500</td>
<td>10000000</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>up</td>
<td>17:05:58:00:00</td>
<td>6466776</td>
<td>70432</td>
</tr>
<tr>
<td>11</td>
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<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>down</td>
<td>0:0:00:00:00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>Physical</td>
<td>ethernetCsmacd</td>
<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>down</td>
<td>34:23:11:16:00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>Physical</td>
<td>ethernetCsmacd</td>
<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>down</td>
<td>0:0:00:00:00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14</td>
<td>Physical</td>
<td>ethernetCsmacd</td>
<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>down</td>
<td>0:0:00:00:00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>Physical</td>
<td>ethernetCsmacd</td>
<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>down</td>
<td>0:0:00:00:00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>16</td>
<td>Physical</td>
<td>ethernetCsmacd</td>
<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e2</td>
<td>up</td>
<td>down</td>
<td>65:21:26:28:00</td>
<td>1728</td>
<td>0</td>
</tr>
<tr>
<td>17</td>
<td>VLAN:</td>
<td></td>
<td>12vlan</td>
<td>0</td>
<td>0</td>
<td>up</td>
<td>lowerLayerDown</td>
<td>88:23:12:34:00</td>
<td>1728</td>
<td>0</td>
</tr>
<tr>
<td>18</td>
<td>IP</td>
<td>ipForward</td>
<td>1968</td>
<td>0</td>
<td>0:0:0:0:0:0:0</td>
<td>up</td>
<td>up</td>
<td>0:0:0:0:0:0:0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>19</td>
<td>IP</td>
<td>ipForward</td>
<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e3</td>
<td>down</td>
<td>down</td>
<td>88:23:12:34:00</td>
<td>1531501176</td>
<td>7660588</td>
</tr>
<tr>
<td>20</td>
<td>VLAN:</td>
<td></td>
<td>13ipvlan</td>
<td>0</td>
<td>0</td>
<td>up</td>
<td>up</td>
<td>88:23:12:34:00</td>
<td>1531501269</td>
<td>7660589</td>
</tr>
<tr>
<td>21</td>
<td>IP</td>
<td>ipForward</td>
<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e3</td>
<td>up</td>
<td>up</td>
<td>88:23:12:34:00</td>
<td>1531501269</td>
<td>7660589</td>
</tr>
<tr>
<td>22</td>
<td>VLAN:</td>
<td></td>
<td>13ipvlan</td>
<td>0</td>
<td>0</td>
<td>up</td>
<td>lowerLayerDown</td>
<td>65:23:34:12:00</td>
<td>3007402828</td>
<td>3994203</td>
</tr>
<tr>
<td>23</td>
<td>IP</td>
<td>ipForward</td>
<td>1500</td>
<td>0</td>
<td>0.e:0:63:2b:2e:e3</td>
<td>up</td>
<td>lowerLayerDown</td>
<td>65:23:34:12:00</td>
<td>3007402828</td>
<td>3994203</td>
</tr>
</tbody>
</table>
SNMP - INFRASTRUCTURE

Student

perform exercise

Delivery system

WEB-BROWSER

HTTP / HTML

APACHE WEB-SERVER

PHP SCRIPTS

NET-SNMP

SNMP

DEMO MIB

LINUX / SOLARIS
UT Demo MIB - Get (v1)

Object Id(s)

Object Value(s)

Error Status

Error Index

SNMP v1
Get
GetNext
Set
SNMP v2c
SNMP v3

Site Search

Simple Times
(issue Sep. 2000)

TSS Mgt Group

Last changed by
the SimpleWeb
May 16, 2001

demoMIB (7)

address (1)
201.202.203.101

info (2)

routeTable (3)

routeEntry (1)

routeDest (1) policy(2) routeNext (3)

<table>
<thead>
<tr>
<th>routeDest</th>
<th>policy</th>
<th>routeNext</th>
</tr>
</thead>
<tbody>
<tr>
<td>201.202.203.102</td>
<td>1</td>
<td>201.202.203.102</td>
</tr>
<tr>
<td>201.202.203.103</td>
<td>1</td>
<td>201.202.203.103</td>
</tr>
</tbody>
</table>
UT Demo MIB - GetNext (v1)

Object Id(s) 7.2.2.0

Object Value(s) 0:6:19:08.00

Error Status 0
Error Index 0

demoMIB (7)
  address (1)
    201.202.203.101
  info (2)
    name (1) \"my System\" 0:6:19:08.00
  routeTable (3)
    routeEntry (1)
      routeDest (1) policy (2) routeNext (3)
      201.202.203.102 1 201.202.203.102
      201.202.203.103 1 201.202.203.103
UT Demo MIB - GetNext (v1)

Object Id(s)
7.3.1.1.201.202.203.103.1

Object Value(s)
201.202.203.103

Error Status
0

Error Index
0

demo1MIB (7)
- address (1)
  201.202.203.101
- info (2)
- routeTable (3)
  - routeDest (1)
  - policy(2)
  - routeNext (3)
    - 201.202.203.102 1 201.202.203.102
    - 201.202.203.103 1 201.202.203.103

name (1) uptime (2)
- \"my System\" 0:6:35:42.00

routeEntry (1)
UT Demo MIB - GetNext (v2c)

Object Id(s):
7.3.1.1.201.202.203.105.1

Object Value(s):
201.202.203.105

Error Status:
0

Error Index:
0
UT Demo MIB - Get (v2c)

<table>
<thead>
<tr>
<th>Object Id(s)</th>
<th>1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object Value(s)</td>
<td>No Such Object available on this agent</td>
</tr>
<tr>
<td>Error Status</td>
<td>0</td>
</tr>
<tr>
<td>Error Index</td>
<td>0</td>
</tr>
</tbody>
</table>

Diagram:
- demoMIB (7)
  - address (1) 201.202.203.101
  - info (2)
  - routeTable (3)
    - routeEntry (1)
      - routeDest (1) policy(2) routeNext (3)

Table:
- 201.202.203.102  1  201.202.203.102
- 201.202.203.103  1  201.202.203.103

Last changed by the SimpleWeb May 16, 2001
UT Demo MIB - Get (v1)

Object Id(s)

Object Value(s)

Error Status: 2
Error Index: 1

demoMIB (7)

routeTable (3)

routeDest (1)  policy(2)  routeNext (3)

routeEntry (1)

name (1)  uptime (2)
"my System"  0:6:39:07.00

address (1)
201.202.203.101

101  102  103  107  108  109

201.202.203.102  1  201.202.203.102
201.202.203.103  1  201.202.203.103
### Security name
- [ ] no Auth, no Priv
- [ ] Auth, no Priv
- [ ] Auth, Priv

### Security level
- [ ] MD5
- [ ] SHA

### Authentication
- **Protocol**: MD5
- **Pass phrase**: (8 or more chars)

### Privacy
- **Protocol**: DES
- **Pass phrase**: (8 or more chars)

#### Object Id(s)
- 7.1.0

#### Object Value(s)
- **Error Status**: Get

#### Error Index
- demoNNIB (7)
  - address (1): 201.202.203.101
  - info (2)
  - routeTable (3)
    - routeEntry (1)
OVERVIEW

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• METHODS TO GUIDE AUTHORS & TEACHERS
METHODS TO GUIDE AUTHORS & TEACHERS

ALSO INTERESTING FOR:

• PEDAGOGICAL STAFF
• RESEARCHERS IN THE AREA OF TEACHING & LEARNING

1) HOW TO ANNOTATE COURSE MATERIAL WITH META-DATA

2) GUIDELINES FOR CREATING COURSE MATERIAL (CREEM)
ANNOTATING COURSE MATERIAL

BASED ON ARIADNE, IMS AND LOM

EIGHT CATEGORIES:

• GENERAL
• LIFECYCLE
• CLASSIFICATION
• PEDAGOGICAL
• RELATIONS
• TECHNICAL
• RIGHTS
• META META-DATA
ANNOTATING COURSE MATERIAL

BASED ON ARIADNE, IMS AND LOM

EIGHT CATEGORIES:

• GENERAL
• LIFECYCLE
• CLASSIFICATION
• PEDAGOGICAL
• RELATIONS
• TECHNICAL
• RIGHTS
• META META-DATA

TITLE
DESCRIPTION
LANGUAGE
AUTHOR
INSTITUTION
CONTACT
...

...
ANNOTATING COURSE MATERIAL

BASED ON ARIADNE, IMS AND LOM

EIGHT CATEGORIES:

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ANNOTATING COURSE MATERIAL

BASED ON ARIADNE, IMS AND LOM

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• RIGHTS
• META META-DATA

RANDOM KEYWORDS

ONTOLOGY
ANNOTATING COURSE MATERIAL

BASED ON ARIADNE, IMS AND LOM

EIGHT CATEGORIES:

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- PEDAGOGICAL
- RELATIONS
- TECHNICAL
- RIGHTS
- META META-DATA
ANNOTATING COURSE MATERIAL
BASED ON ARIADNE, IMS AND LOM

EIGHT CATEGORIES:

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- CLASSIFICATION
- PEDAGOGICAL
- RELATIONS
- TECHNICAL
- RIGHTS
- META META-DATA

RELATED MATERIAL
PART OF ...
BASIS FOR ...
REFERENCE TO ...
REFERENCED BY ...
...
ANNOTATING COURSE MATERIAL

BASED ON ARIADNE, IMS AND LOM

EIGHT CATEGORIES:

• GENERAL
• LIFECYCLE
• CLASSIFICATION
• PEDAGOGICAL
• RELATIONS
• TECHNICAL
• RIGHTS
• META META-DATA

SIZE IN BYTES
LOCATION (URL)
MIME TYPE
OS
BROWSER REQ. …

…
ANNOTATING COURSE MATERIAL

BASED ON ARIADNE, IMS AND LOM

EIGHT CATEGORIES:

• GENERAL
• LIFECYCLE
• CLASSIFICATION
• PEDAGOGICAL
• RELATIONS
• TECHNICAL
• RIGHTS
• META META-DATA

COPYRIGHTED?
PUBLISHER
COSTS
...
...
ANNOTATING COURSE MATERIAL

BASED ON ARIADNE, IMS AND LOM

EIGHT CATEGORIES:

• GENERAL
• LIFECYCLE
• CLASSIFICATION
• PEDAGOGICAL
• RELATIONS
• TECHNICAL
• RIGHTS
• META META-DATA
GUIDELINES FOR CREATING MATERIAL

CREEM

• PARTICLE
• C-ATOM
• C-MODULE
• C-COURSE
CONTAINMENT HIERARCHY
EXAMPLE

△ = course specific meta-data
● = meta-data
CONCLUSIONS

CANDLE HAS THREE GOALS:

- PROVISIONING OF AN OPEN COURSEWARE SERVICE
- CREATION OF OPEN COURSEWARE COMPONENTS
- DEVELOPMENT OF METHODS TO GUIDE AUTHORS & TEACHERS

PROJECT WELL ON ITS WAY

NEXT YEAR RESULTS WILL BE AVAILABLE TO EUNICE PARTNERS