

# **An Intelligent Email Sorter Extension for Thunderbird**



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- Supervisor : Dr. Eric McCreath

# Issues

- E-mail management : Everyday task with a lot of email items
- E-mail : Small database with sender, text, ...
- Sorting e-mail items : time and money
- Automatic Induction → Help user

# Preview

User Command

The screenshot shows the Thunderbird email client interface. The left sidebar displays a folder tree for the account 'u4288977@...bugMode', including 'Inbox', 'Drafts', 'Sent', 'Trash (32)', 'anu common', 'etc', 'iems', 'myself', and 'Local Folders' (Unsent, Trash). The main pane shows a list of messages with columns for 'Subject', 'Sender', 'Date', and 'Predict'. A context menu is open over the selected message 'CS projects practice mtg #8: 17:00 Thurs 29 May' by Peter Strazdins. The menu items include 'Intelligent E-Mail Sorter', 'Show/Hide prediction', 'Archive all messages', 'Change prediction of selected messages to ...', 'Move selected messages to ...', 'Open Message in New Window', 'Reply to Sender Only', 'Reply to All', 'Forward', 'Edit As New...', 'Move To', 'Copy To', 'Move to "iems" Again', 'Tag', 'Mark', 'Save As...', 'Print Preview', 'Print..', 'Delete Message', and 'Get Selected Messages'. A callout points to the 'Change prediction of selected messages to ...' option. Another callout points to the 'Archive' and 'Predict' buttons in the top toolbar. A third callout points to the 'Predict' column in the message list. A fourth callout points to the folder tree on the left.

Subject	Sender	Date	Predict
government immigration support	u4288977@anu.edu.au	27/05/08 19:16	myself
Re: [COMP6320] I will visit you tomorrow.	Eric McCreath	27/05/08 09:10	iems
CS projects practice mtg #8: 17:00 Thurs 29 May	Peter Strazdins	26/05/08 17:10	iems
Re: [COMP6320] Meeting	Eric McCreath	26/05/08 09:51	iems
Re: [COMP6320] Meeting	Eric McCreath	26/05/08 09:51	iems
Re: CS Projects practice mtg #8: N101, 5pm May 22	Peter Strazdins	19/05/08 12:45	iems
[Students.all] On Campus 16 May 2008 - student edi...	studentlist.coord@anu.edu.au	16/05/08 17:09	anu common
[Students.all] Last date to drop a course without fail...	studentlist.coord@anu.edu.au	12/05/08 16:28	anu common
CS Projects practice mtg #7: N101, 5pm May 15	Peter Strazdins	12/05/08 14:23	iems
Re: [COMP6703] correction.	Eric McCreath	09/05/08 10:10	iems
[COMP6703] About objectives	u4288977@anu.edu.au	08/05/08 21:50	myself
457 visa and writing		07/05/08 17:46	Unknown
Re: Your OSHC		07/05/08 16:44	anu common
Re: Your OSHC		07/05/08 16:44	anu common
		05/05/08 09:23	anu common
		28/04/08 15:11	myself
		28/04/08 11:27	iems
			anu common
			etc
			iems
			Unknown
			anu common
			Unknown
			Unknown

User Command

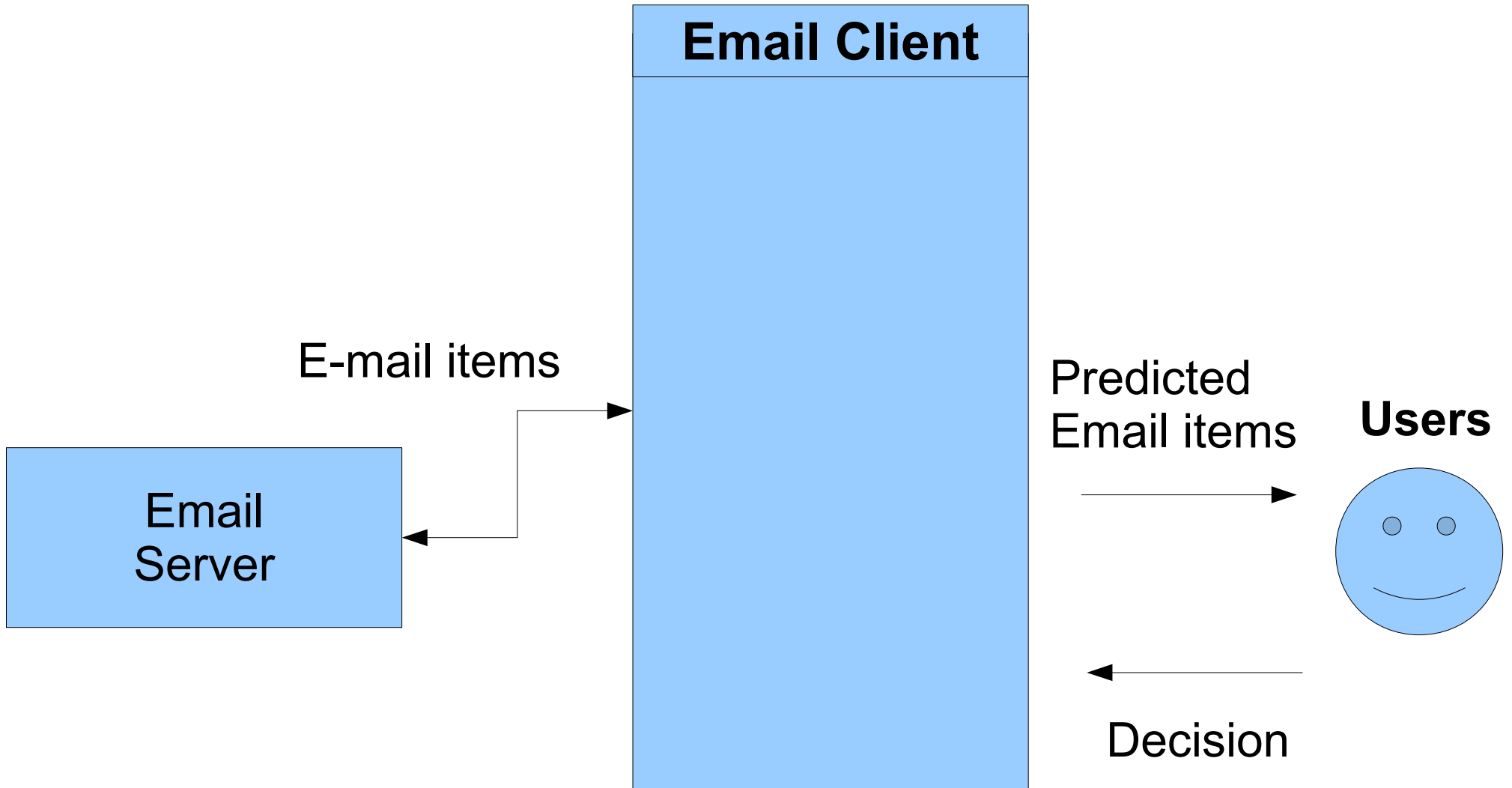
Predicted Folder

Folders where email items will be organised

# Key Issues

- Intelligent E-mail sorting
- Restructuring Thunderbird : Extension
- User pattern : What user will do
- Prediction rules in Email sorting
- Future Research : AI, Smart clustering

# System and Interaction



# Gathering user pattern

**Target folder**

**User Pattern**

**Selected Email item**

**User patterns are used to know :**  
how a user have organised e-mail items  
-> how the user will organise e-mail items

Subject	Sender	Date
government immigration support	u4288977@anu.edu.au	27/05/08 19:16
Re: [COMP6320] I will visit you tomorrow	Eric McCreath	27/05/08 09:51
CS projects practice mtg #8: 17:00 Thurs 29 May	Peter Strazdins	26/05/08 17:10
Re: [COMP6320] Meeting	Eric McCreath	26/05/08 09:51
Re: [COMP6320] Meeting	Eric McCreath	26/05/08 09:51
Re: CS Projects practice mtg #8: 17:00 Thurs 29 May	Peter Strazdins	19/05/08 12:45
[Students.all] On Campus 16 May 2008 - Student edition	studentlist.coord@anu.edu.au	
[Students.all] Last date to drop a course - Student failure	studentlist.coord@anu.edu.au	
CS Projects practice mtg #7: N101 - 5pm	Peter Strazdins	
Re: [COMP6703] correction.	Eric McCreath	
[COMP6703] About objectives	u4288977@anu.edu.au	
457 visa and writing	Edwin Gruhner	
Re: Your OSHC	Overseas Student Health Cover	07/05/08 16:44
Re: Your OSHC	Overseas Student Health Cover	07/05/08 16:44
Your OSHC	Overseas Student Health Cover	05/05/08 09:23
Re: Source code	u4288977@anu.edu.au	28/04/08 15:11
Re: Some problems in this project	Eric McCreath	28/04/08 11:27
[Coursework.postgraduates] Annual General Meeting (AGM) of the ...	studentlist.coord@anu.edu.au	24/04/08 11:04
feedback on report drafts	Peter Strazdins	17/04/08 18:27
IEO Melbourne trip April 20-25th - Hurry tickets selling fast !	Events IEO	16/04/08 15:43
[Students.all] On Campus 2008 - Student Edition	studentlist.coord@anu.edu.au	10/04/08 17:07
[Feitpostgrad_students] CECS Postgraduate Coursework Lunch	Ljiljana Argy	09/04/08 12:44
Re: [Enquiry] I'm interested in your company as a programmer.	Edwin Gruhner	08/04/08 21:39

Unread: 0 Total: 72

# Gathering user pattern (cont.)

- email : {sender, title, date, body text, ...}
- folder : {name, uri, ...}
- set of user pattern : {(email x folder)}

# Prediction (Induction)

- Analysis on gathered user patterns
- Creating prediction Rules for e-mail sorting  
: Reasoning target folder of e-mail items
- First matching rule → Folder name
- Unknown if there is no match
- Prototype using sender name and folder uri
- Future research

# Thunderbird without Extension

The screenshot displays the Thunderbird email client interface. The window title is "Inbox for u4288977@anu.edu.au - Thunderbird". The menu bar includes File, Edit, View, Go, Message, Tools, and Help. The toolbar contains icons for Get Mail, Write, Address Book, Reply, Reply All, Forward, Tag, Delete, Junk, Print, Back, and Forward. A search box labeled "Subject or Sender" is located in the top right.

The left sidebar shows the folder structure under "All Folders":

- u4288977@...bugMode
  - Inbox
  - Drafts
  - Sent
  - Trash (32)
  - anu common
  - etc
  - iems
  - myself
- Local Folders
  - Unsent
  - Trash

The main pane displays a list of emails with columns for Subject, Sender, and Date. The selected email is:

Subject	Sender	Date
government immigration support	u4288977@anu.edu.au	27/05/08 19:16
Re: [COMP6320] I will visit you tomorrow.	Eric McCreath	27/05/08 09:10
<b>CS projects practice mtg #8: 17:00 Thurs 29 May</b>	<b>Peter Strazdins</b>	<b>26/05/08 17:10</b>
Re: [COMP6320] Meeting	Eric McCreath	26/05/08 09:51
Re: [COMP6320] Meeting	Eric McCreath	26/05/08 09:51
Re: CS Projects practice mtg #8: N101, 5pm May 22	Peter Strazdins	19/05/08 12:45
[Students.all] On Campus 16 May 2008 - student edition	studentlist.coord@anu.edu.au	16/05/08 17:09
[Students.all] Last date to drop a course without failure	studentlist.coord@anu.edu.au	12/05/08 16:28
CS Projects practice mtg #7: N101, 5pm May 15	Peter Strazdins	12/05/08 14:23
Re: [COMP6703] correction.	Eric McCreath	09/05/08 10:10
[COMP6703] About objectives	u4288977@anu.edu.au	08/05/08 21:50
457 visa and writing	Edwin Gruhner	07/05/08 17:46
Re: Your OSHC	Overseas Student Health Cover	07/05/08 16:44
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Re: Source code	u4288977@anu.edu.au	28/04/08 15:11
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[Coursework.postgraduates] Annual General Meeting (AGM) of the ...	studentlist.coord@anu.edu.au	24/04/08 11:04
feedback on report drafts	Peter Strazdins	17/04/08 18:27
IEO Melbourne trip April 20-25th - Hurry tickets selling fast !	Events IEO	16/04/08 15:43
[Students.all] On Campus 2008 - Student Edition	studentlist.coord@anu.edu.au	10/04/08 17:07
[Feitpostgrad_students] CECS Postgraduate Coursework Lunch	Ljiljana Argy	09/04/08 12:44
Re: [Enquiry] I'm interested in your company as a programmer.	Edwin Gruhner	08/04/08 21:39
CS Projects practice mtg #5: N101 5pm Thu Apr 10	Peter Strazdins	07/04/08 18:28

The selected email details are:

**Subject:** CS projects practice mtg #8: 17:00 Thurs 29 May  
**From:** Peter Strazdins <Peter.Strazdins@cs.anu.edu.au>  
**Date:** 26/05/08 17:10  
**To:** Yoon Chang <u4288977@anu.edu.au>, Dmitry Kislov <u4330698@anu.edu.au>, Xiao Wang <u4266538@anu.edu.au>,  
**Cc:** Peter Strazdins <peter@cs.anu.edu.au>

The email body text is:

Hi CS Projects CoP members,

a reminder for our coming meeting:  
Presentations - Practice and Feedback

For this session, I propose that:

- \* you read the excerpts from the 2nd half of Zobel Ch 10 beforehand, and review the excerpts on presentations way back from meeting #1
- \* those of your that wish to to do a partial dry-run

The status bar at the bottom right shows "Unread: 0" and "Total: 72".

# Thunderbird with Extension

The screenshot shows the Thunderbird email client interface. The main window displays a list of emails in a table format. A green box highlights the 'Prediction' column, which contains predicted folder names for each email. A callout bubble points to this column with the text 'Predicted Folder'.

Subject	Sender	Date	Prediction
government immigration support	u4288977@anu.edu.au	27/05/08 19:16	myself
Re: [COMP6320] I will visit you tomorrow.	Eric McCreath	27/05/08 09:10	iems
CS projects practice mtg #8: 17:00 Thurs 29 May	Peter Strazdins	26/05/08 17:10	iems
Re: [COMP6320] Meeting	Eric McCreath	26/05/08 09:51	iems
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feedback on report drafts	Peter Strazdins	17/04/08 18:27	iems
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[Feitpostgrad_students] CECS Postgraduate Course...	Ljiljana Argy	09/04/08 12:44	Unknown
Re: [Enquid] I'm interested in your company as a pro...	Edwin Gruhner	08/04/08 21:30	Unknown

Prediction column is shown.

**Subject:** CS projects practice mtg #8: 17:00 Thurs 29 May  
**From:** Peter Strazdins <Peter.Strazdins@cs.anu.edu.au>  
**Date:** 26/05/08 17:10  
**To:** Yoon Chang <u4288977@anu.edu.au>, Dmitry Kislov <u4330698@anu.edu.au>, Xiao Wang <u4266538@anu.edu.au>.  
**Cc:** Peter Strazdins <peter@cs.anu.edu.au>

Hi CS Projects CoP members,

a reminder for our coming meeting:  
Presentations - Practice and Feedback

For this session, I propose that:

- \* you read the excerpts from the 2nd half of Zobel Ch 10 beforehand, and review the excerpts on presentations way back from meeting #1
- \* those of your that wish to to do a partial dry-run

Unread: 0 Total: 72

# Exhibition

The screenshot shows the Thunderbird email client interface. The main window displays an inbox for the account 'u4288977@anu.edu.au'. The inbox list includes columns for Subject, Sender, Date, and Prediction. A context menu is open over the selected email, showing options like 'Intelligent E-Mail Sorter', 'Show/Hide prediction', and 'Change prediction of selected messages to ...'. The detailed view of the selected email is visible below the list.

Subject	Sender	Date	Prediction
government immigration support	u4288977@anu.edu.au	27/05/08 19:16	myself
Re: [COMP6320] I will visit you tomorrow.	Eric McCreath	27/05/08 09:10	iems
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Re: [COMP6703] correction.	Eric McCreath	09/05/08 10:10	iems
[COMP6703] About objectives	u4288977@anu.edu.au	08/05/08 21:50	myself
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Your OSHC		05/05/08 09:23	anu common
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Re: Some problems in this project		28/04/08 11:27	iems
[Coursework.postgraduates] Annual General I			anu common
feedback on report drafts			etc
IEO Melbourne trip April 20-25th - Hurry tickets			iems
[Students.all] On Campus 2008 - Student Edit			Unknown
[Feitpostgrad_students] CECS Postgraduate C			myself
Re: [Enquire] I'm interested in your company s		08/04/08 21:39	Unknown

**Selected Email Details:**

**Subject:** CS projects practice mtg #8: 17:00 Thurs  
**From:** Peter Strazdins <Peter.Strazdins@cs.anu.edu.au>  
**Date:** 26/05/08 17:10  
**To:** Yoon Chang <u4288977@anu.edu.au>, Dmi  
**Cc:** Peter Strazdins <peter@cs.anu.edu.au>

Hi CS Projects CoP members,

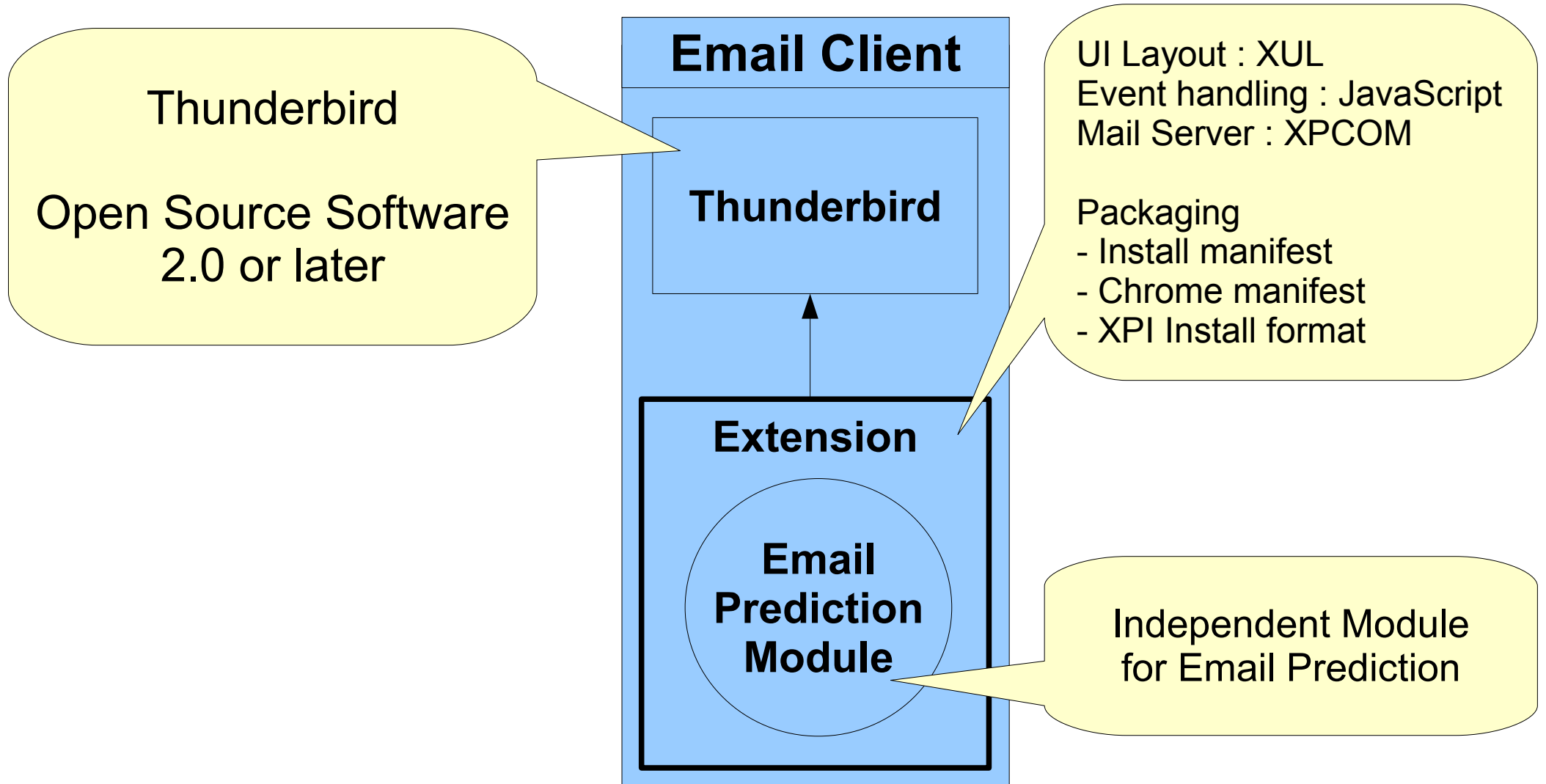
a reminder for our coming meeting:  
 Presentations - Practice and Feedback

For this session, I propose that:

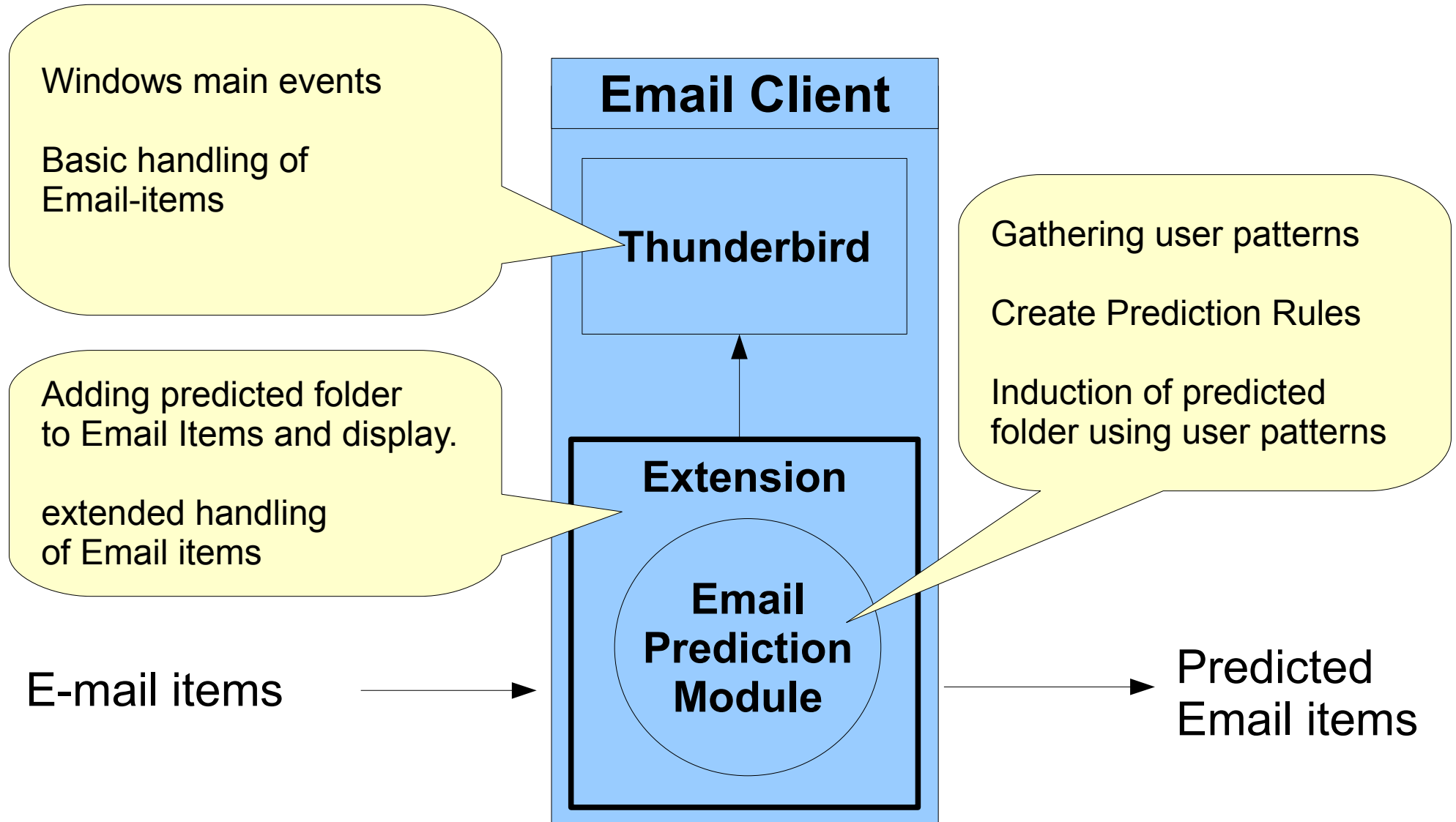
- \* you read the excerpts from the 2nd half of Zobel Ch 10 beforehand, and review the excerpts on presentations way back from meeting #1
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Unread: 0 Total: 72

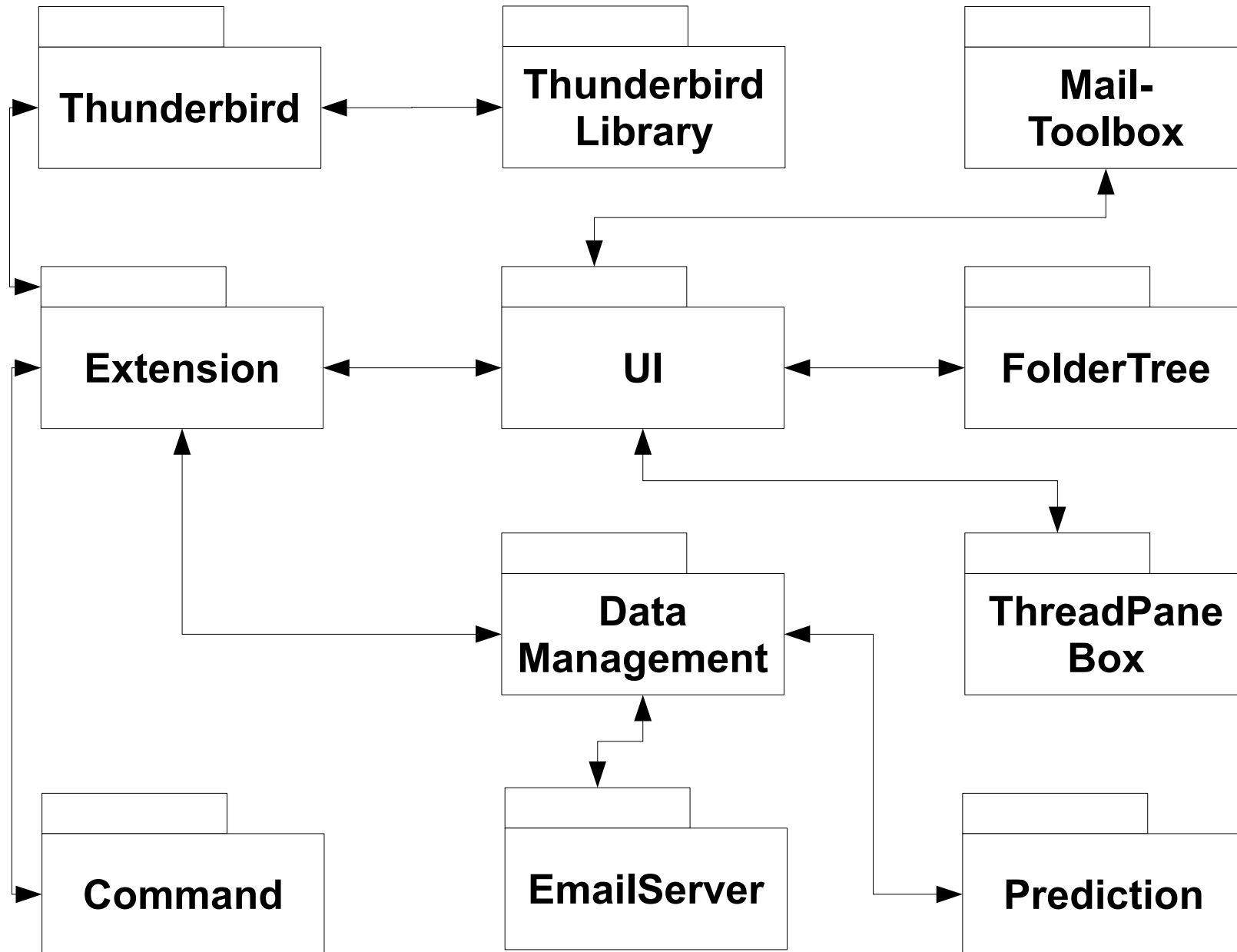
# Structure of System



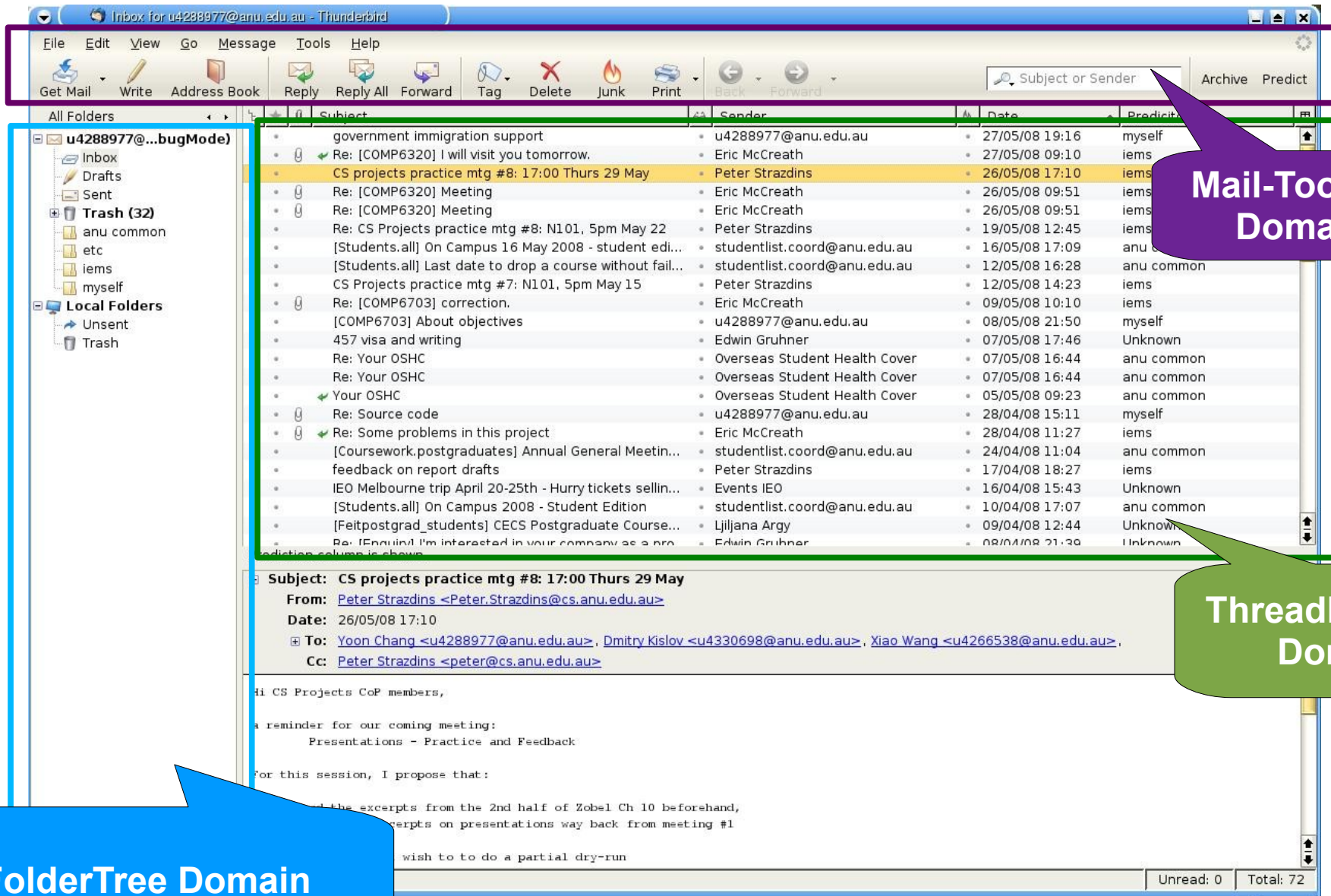
# Structure of System (Cont.)



# Domain Structure



# UI and Command Domain

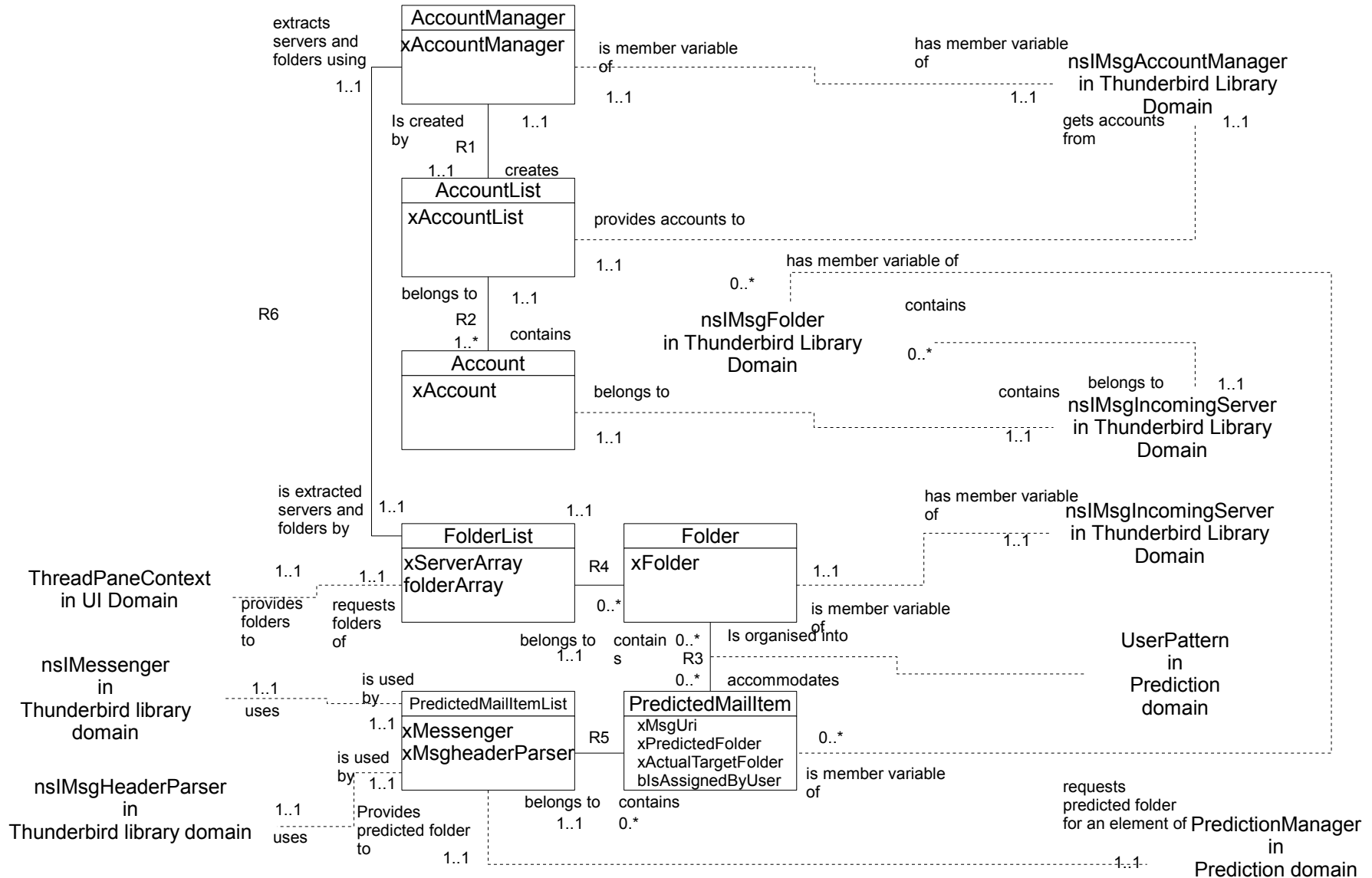


FolderTree Domain

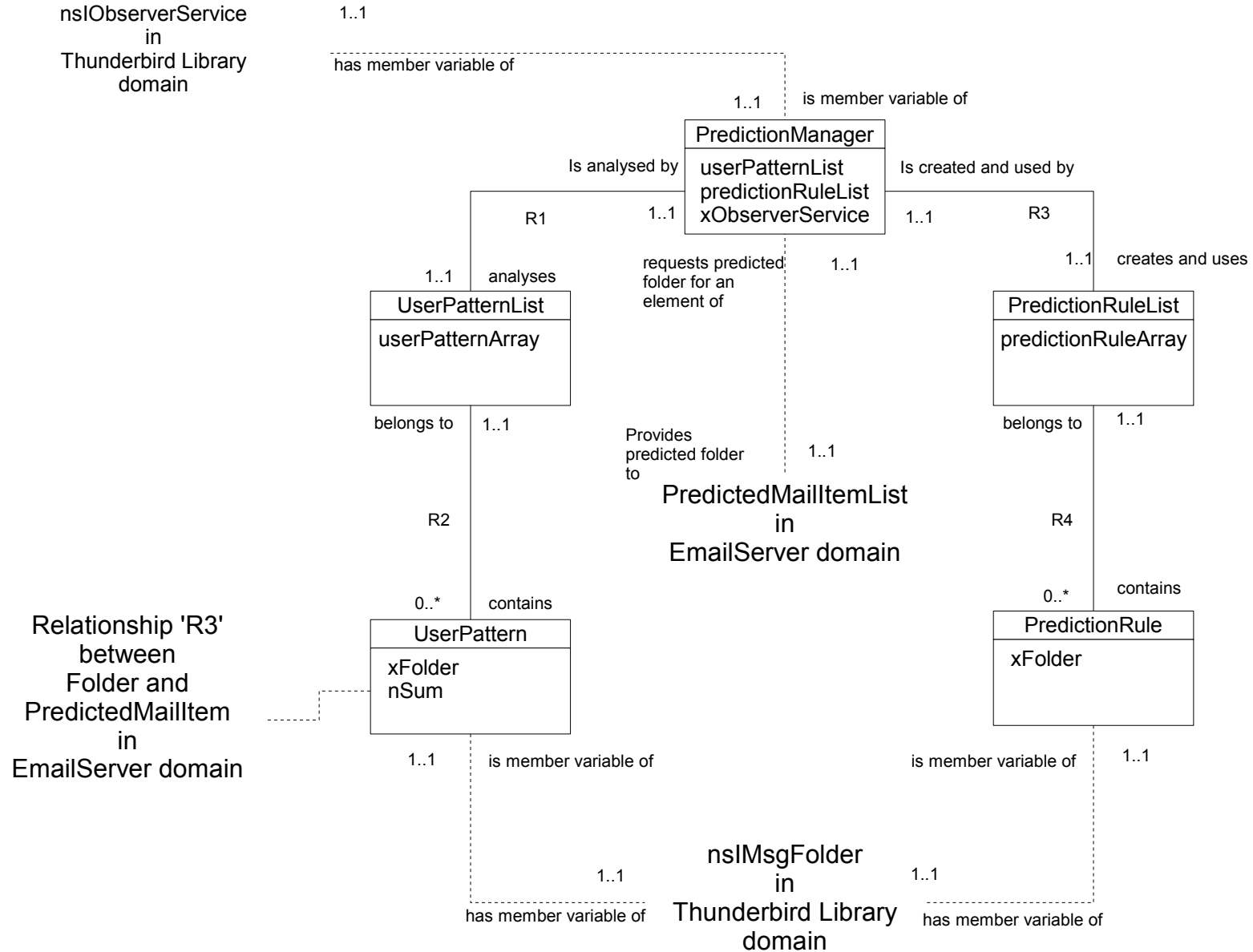
Mail-Toolbox Domain

ThreadPaneBox Domain

# EmailServer Domain



# Prediction Domain



# Implementation issue

- Complexity of Thunderbird
  - Many languages : XUL, Javascript and XPCOM
  - Numerous global variables and global functions scattered in 764 files
  - Thunderbird library : XPCOM components
  - No documentation about the structure of Thunderbird, only some sample source codes
- Limitation with Thunderbird : global variable gDBView returned by Thunderbird library
  - Can not modify the appearance of UI
  - Account -> Folder -> Email items (Impossible)
  - Email items shown by UI -> find folder using Thunderbird functions which internally use XPCOM components

# Evaluation and Test

- Evaluation for Requirement
  - Check list to take a look at each requirement item
  - All requirement items are satisfied
  - Some enhancement is required
- Test
  - Event -> check functions if the System works correctly
  - No significant errors.

# Plan / Management

<b>Stage</b>	<b>weeks</b>
• <b>Documentation</b>	: 15 (13)
• <b>Req. Specification</b>	: 2
• <b>Background Research</b>	: 6 (5)
• <b>Requirement Analysis</b>	: 4
• <b>Modelling</b>	: 2
• <b>Implementation</b>	: 5 (4)
• <b>Test / Acceptance</b>	: 2

# **Conclusion and Future work**

- Complexity of Thunderbird
- Flexible design and source code

# **The End**

- Thank you very much
- Question and Suggestion