

NOTICE!

- These materials are prepared only for the students enrolled in the course Distributed Software Development (DSD) at the Department of Computer Science and Engineering, University of Mälardalen, Västerås, Sweden and at the Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia (year 2010/2011).
- For all other purposes, authors' written permission is needed!
- The purpose of these materials is to help students in better understanding of lectures in DSD and not their replacement!

Distributed Software Development



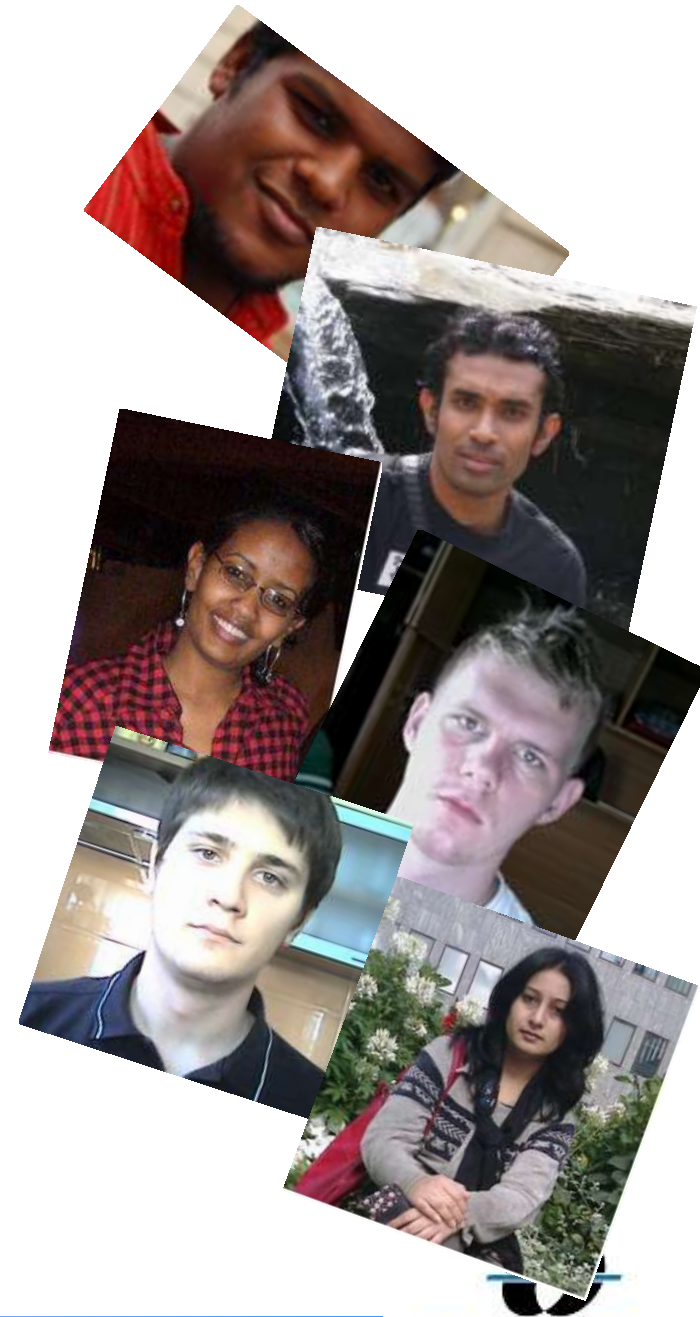
Final Presentation



Our Team



- **Faiz UL Muram**
- **Vice Šimunov**
- **Mislav Stipetić**
- **Lidia Tesfazghi Kahsu**
- **Shah Md. Shamsul Alam**
- **Kaushik Mohanraj**



Geographical Division



Presentation overview

- The Task at Hand
- The „Big Picture”
- Design Considerations

Vice

- Project Organization
- Project Flow

Kaushik

- Results
- Experiences
- Live Demo

Mislav

The task at hand



Project goals

- Modern IT support for Public Transportation
 - Welcome to the 21st century!
- Easy and Reliable
 - Focus on Usability
- Transparent information about the system
 - Routes, Lines, TimeTables
- User personalized service
 - SMS reports based on User Tracking

SCORE Vision

- Modernizing Public Transportation
 - Municipalities around the world
- Provide core features
 - That can be used as a reference
- Commercial reference project



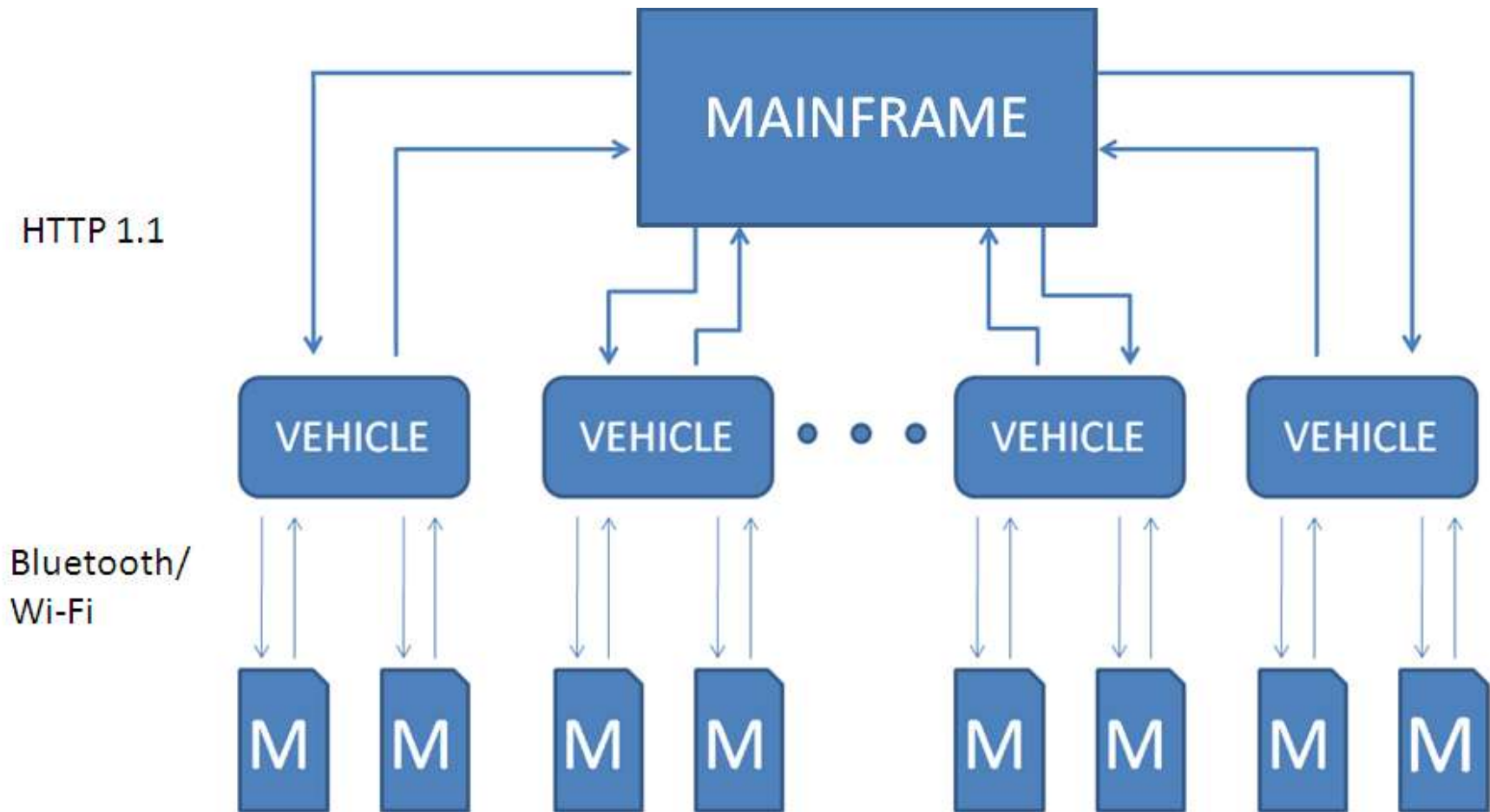
Requirements definition

- Register and purchase EzFare credits
- Ticket management
- Registered Passenger detection – Issue a Ticket
- Provide useful services about the system
- Passenger tracking

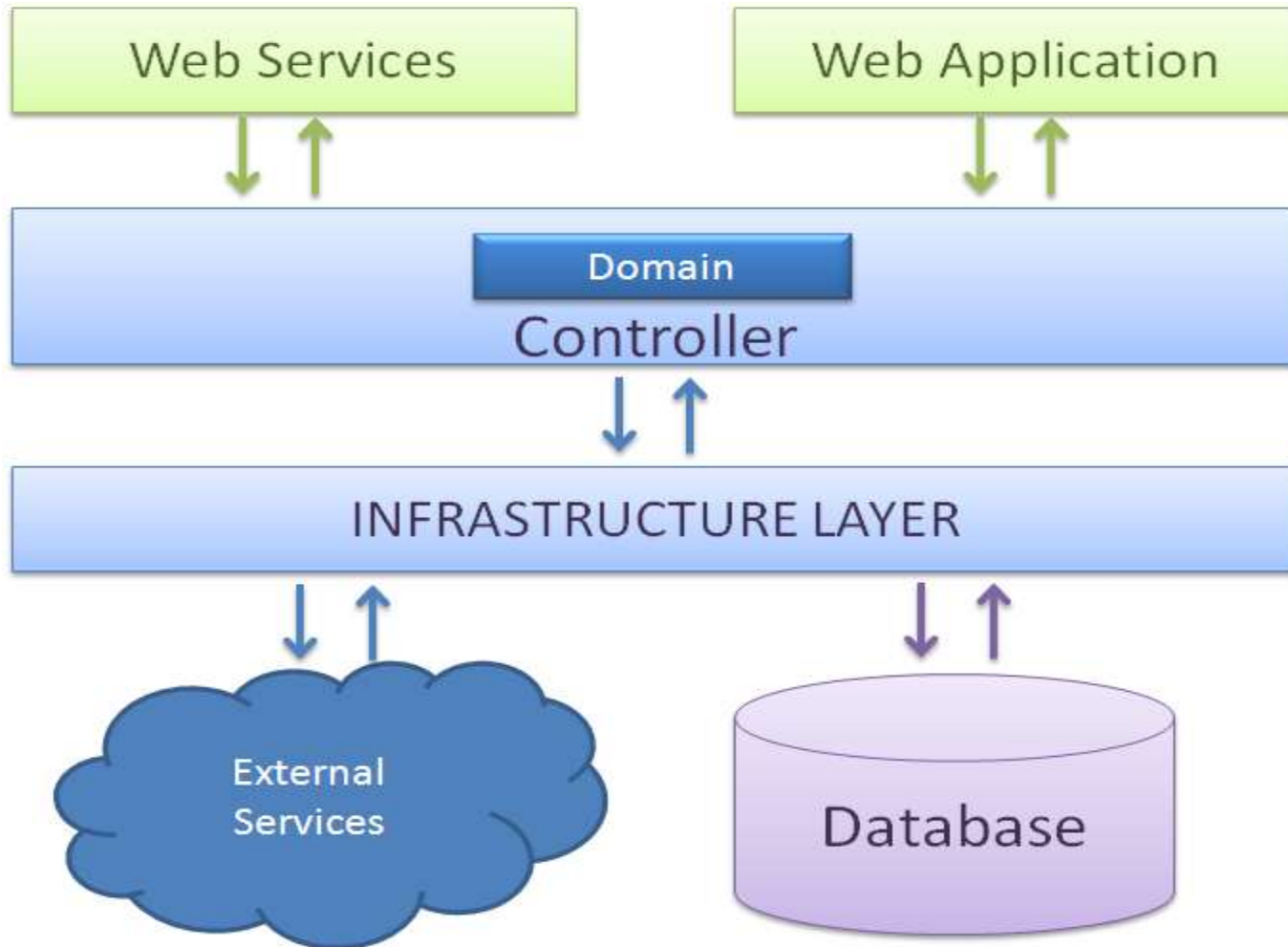


The „Big Picture”

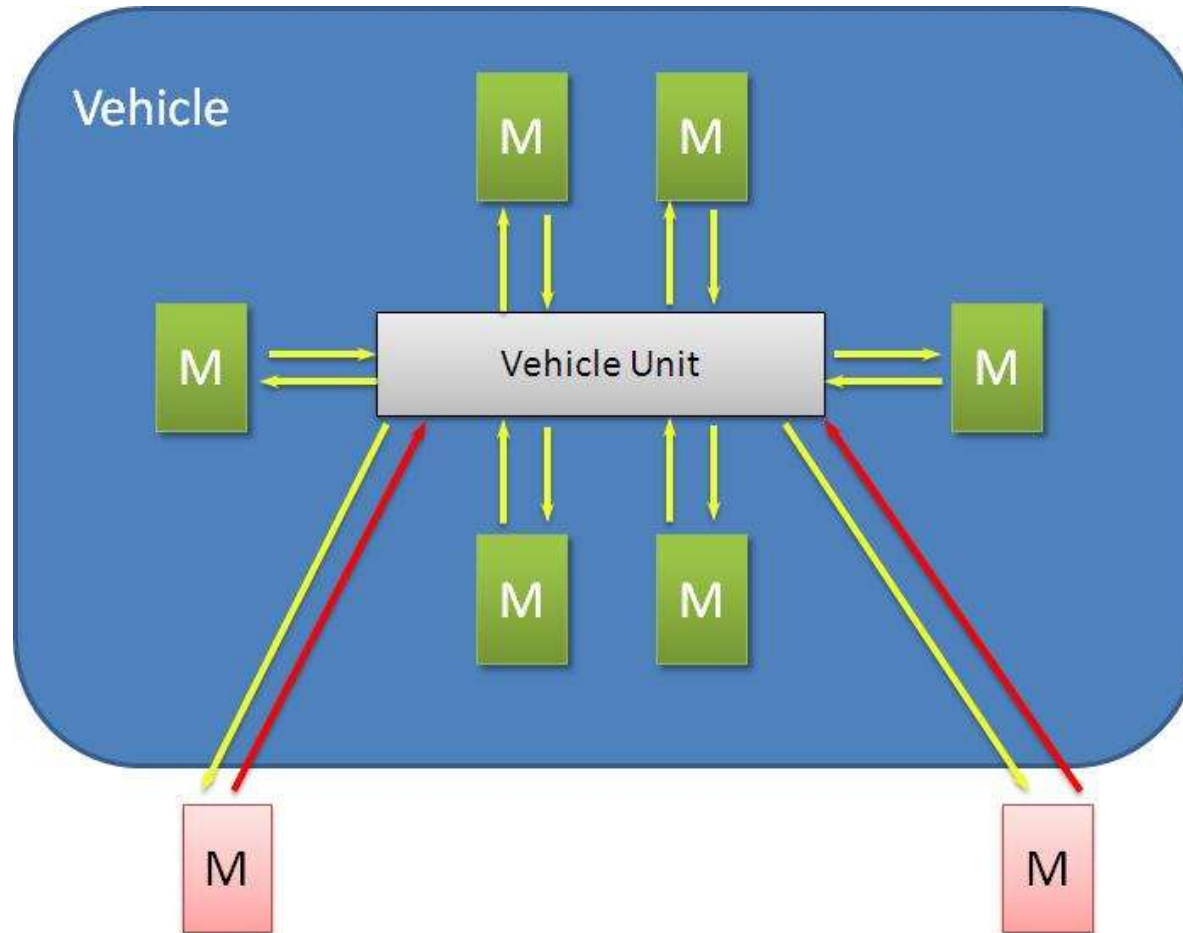
Complex system



Core application - Mainframe




Vehicle and mobile units



Design Considerations


The Setting



- Real-Time Environment
-  needed to adapt
 - Parts of the system are Real-Time
- Additional tools necessary?


=> Formal Methods

Formal Methods

- Verify Real-Time hard-constraints
- To enter  Formal Methods Contest
- Software used – UPPAAL
- Prof. Paul Pettersson provided valuable information



Design Decisions

-  **EzFare** is divided among three platforms
 - Mobile phones, Vehicle computers, Server
- **Strict interfaces/communication protocols**
 - To counter the Integration difficulties.
- **Different tools and technologies were available**
 - Mobile Phones: Android OS
 - Vehicle Unit: Linux OS
 - Mainframe: Windows Server

Design Decisions (2)

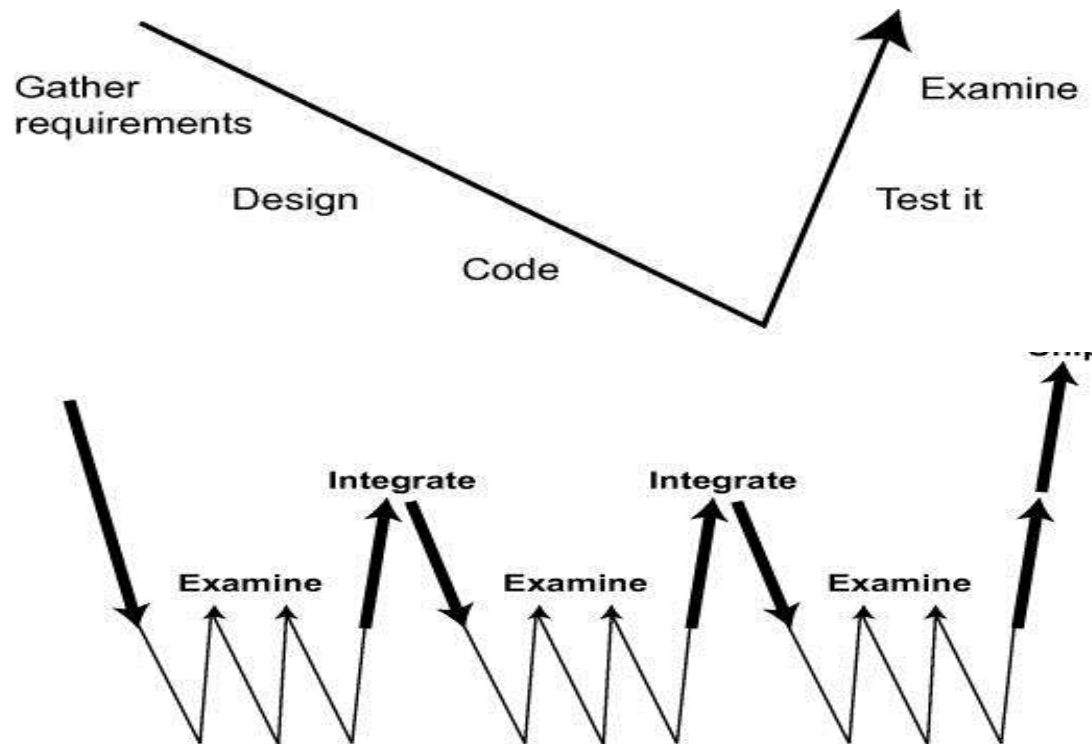
- Multiple applications using the same data
 - Medium sized project
 - => Layered Architecture
- System should be Extensible
 - => Domain Driven Design
- Patterns used:
 - IoC, Factory, DAO, Role Based Access Control, ...

Project Organization





Development process



Reference: <http://www.crosstalkonline.org/storage/issue-archives/2008/200805/200805-Cockburn.pdf>

Communication Infrastructure



Life line of our Project



Reservoir of ***all*** our project artifacts

- Got it – Drop it in !!!
600 Files, 200 Folders

Development guidelines

- Coding guidelines: CamelCase
 - The code looks uniform
- Self-documenting code: XML comments
 - Makes Life easier in team dev
- SVN: Tags and Branches
 - Tags for each Release
 - Branches for development on the same code

Project Flow



Milestones



- Alpha Version
 - Successfull – minor integration problems
- Beta Version
 - Successfull
- Release Candidate
 - Successfull – minor integration problems
- Final Version
 - Successfull – integration problems

Activity Chart

Task \ Week	Week															
	W 39	W 40	W 41	W 42	W 43	W 44	W 45	W 46	W 47	W 48	W 49	W 50	W 51	W 52	W 1	W 2
Requirement Analysis	█	█		█		█			█		█		█			
Project Design		█	█	█		█			█		█		█			
Implementation			█	█	█	█	█	█	█	█	█	█	█	█	█	
Testing			█	█	█		█	█		█	█	█		█	█	█
Integration					█	█		█	█			█	█			█
Documentation	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█

Task divison

	Tasks	Team Member
	Mobile Unit	MS
	Vehicle Unit	MS
	Mainframe	VS, LT, KM, FM, SM
	Domain Model, MVP, DAL	VS
	Tests	VS
Mainframe	Transaction Manager	KM
	ASP.Net pages	FM,SM
	Persistence (O/R mapping)	VS
	SMS Gateway	LT
	Documentation	KM, LT
	Database administration	SM
	Costumer Communication	VS
	System administration	VS

Working Hours



Member	Alpha	Beta	RC	Final	Total
Faiz Ul Muram	97	45	73	95	310
Lidia Kahsu	90.5	41	98	79	308.5
Shamsul Alam	66	47	79	80	272
Vice Simunov	167	50	65	98	380
Mislav Stipetic	93	30	55	85	263
Kaushik Mohanraj	89	39	78	70	276
Total	602.5	252	448	507	1809.5

Results





Features

- Web applications
 - EzFare Frontend – UI for users
 - EzFare Backend – UI for admins
- Mobile application
 - For passengers
- Vehicle application
 - No UI – to be installed on a Vehicle Unit

Additional Features



- Group SMS reports
 - Changes in Line runs
 - Emergencies such as Traffic accidents
- Personal SMS reports
 - Route optimizing
- Cool feature
 - Service for PTSPL



The Destiny Collaboration



Further improvements

- Graphical Representation of Routes on WA
 - It's in a dull list for now.
 - This is to be fixed, for SCORE.
- More polishing on the Frontend
 - Needs more work for SCORE
- Mobile Application for other platforms
 - Not being considered for SCORE



Experiences

Communication with



- Stakeholders:
 - Elisabetta Di Nitto and Matteo Rossi
 - Nico Platini for Formal Methods
- Communication with Stakeholders:
 - Good Rapport maintained
 - Quicker Response than expected

Positive experiences

- Most of them are anyway...
- Good understanding among Team members
- Steep Learning Curve
 - Technical and Cultural Learning experience

Difficulties

- Working on different platforms
 - Integration issues
- Availability of team members
 - Some were ill...
- Sleepless nights
 - Sometimes it's better to manage your time 😊
- Deployment issues
 - Fitting the enormous application on the Server

Mistakes

- Last minute feature adding!!
 - Never, ever do this!!!!
- Repetition of discussion on the same point
 - Some meetings were not productive
- Uneven work distribution
 - More time to for teaching programming
- Too many frameworks?

Lessons learned

- Difficulties in Distributed Development
 - So many!
- Adapting to team members from different cultural background
 - 5 Nationalities in a 6 member team.
- Efficiently handling Technical problems and other issues

Demo



Note of Appreciation



Prof. Ivica Crnković



Prof. Mario Zagar



Aneta Vulgarakis



Prof. Paul Pettersson

Questions



Tack

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Thank You

Hvala

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