Overview

Network Information System Technologies

Schedule and Instructor

- Group 3E Theory + Seminars
  - Wednesday 1:00 to 2:30 PM
  - Friday 9:30 to 11:00 AM
- Francisco Daniel Muñoz Escoí
  - fmunyoz@dsic.upv.es, fmunyoz@iti.upv.es
  - Consultations:
    - By appointment
  - Office:
    - 1D43 (DSIC)
- Questions and doubts about theory and labs are welcome.

Index

1. Goals

- General:
  - Provide a pragmatic approach to the design and implementation of distributed systems.
- Specific:
  1. Understand the main properties of distributed systems
  2. Ability to leverage some relevant technologies and approaches
  3. Ability to propose adequate architectures to resolve specific problems

1. Goals

- General:
  - Provide a pragmatic approach to the design and implementation of distributed systems.
- Specific:
  1. Understand the main properties of distributed systems:
     - Problems that need to be addressed
     - Attainable properties, use cases
     - Impact of system architecture on the attainable properties, and ability to address potential problems

1. Goals

- General:
  - Provide a pragmatic approach to the design and implementation of distributed systems.
- Specific:
  1. Understand the main properties of distributed systems
  2. Ability to leverage some relevant technologies and approaches
     - Asynchronous programming for component implementation
     - Middleware to ease component composition and interaction

1. Goals

- General:
  - Provide a pragmatic approach to the design and implementation of distributed systems.
- Specific:
  1. Understand the main properties of distributed systems
  2. Ability to leverage some relevant technologies and approaches
  3. Ability to propose adequate architectures to resolve specific problems
     - Study and analysis of system examples
     - Hands-on usage of relevant technologies for lab assignments

Index

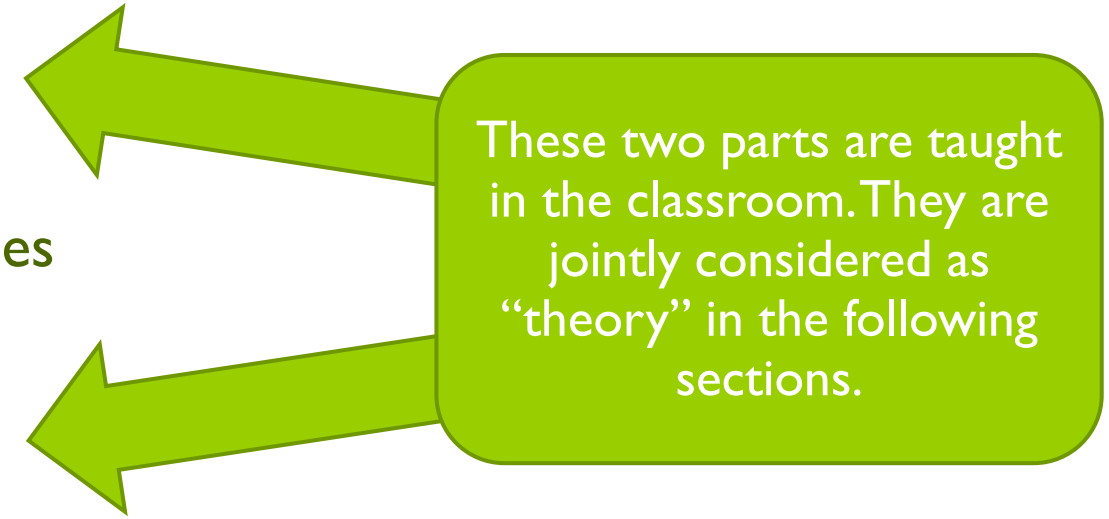
1. Goals
2. Structure
3. Theory
4. Labs
5. Grading
6. Bibliography

2. Structure

- Course with 6 credits
  - Theory and seminars have a common set of units
- Theory (1.5 cr)
  - General principles
  - Reachable properties
  - Problems imposed
- Seminars (3 cr)
  - Basic technologies
  - Examples, case studies, and problem resolution
- Labs (1.5 cr)
  - Implementation of simple systems

2. Structure

- Course with 6 credits
  - Theory and seminars have a common set of units
- Theory (1.5 cr)
  - General principles
  - Reachable properties
  - Problems imposed
- Seminars (3 cr)
  - Basic technologies
  - Examples, case studies, and problem resolution
- Labs (1.5 cr)
  - Implementation of simple systems



Index

1. Goals
2. Structure
3. Theory
4. Labs
5. Grading
6. Bibliography

3. Theory. Units

1. Introduction and Motivation
2. JavaScript and NodeJS
3. Middleware. ZeroMQ
4. Service deployment. Docker
5. Failure management
6. Scalability
7. Epilogue

3. Theory. Units

- Considering the 28 classes in this first semester, those units will be distributed in the following way:
  - Unit 1: 3 sessions (including also the current overview)
  - Unit 2: 7 sessions
  - Unit 3: 6 sessions
  - Unit 4: 4 sessions
  - Unit 5: 3 sessions
  - Unit 6: 3 sessions
  - Unit 7: 2 sessions

Index

1. Goals
2. Structure
3. Theory
4. Labs
5. Grading
6. Bibliography

4. Labs

- Lab sessions will start next week.
  - Project 0: JavaScript basics. Without supervision.
- Technologies to be used:
  - JavaScript + NodeJS
  - ØMQ (NodeJS mapping)
  - Docker

- Three projects that use those technologies:
  1. Reverse TCP/IP proxy (3 sessions)
  2. NodeJS and ØMQ application development (4 sessions)
  3. Deployment (3 sessions)

4. Lab projects

1. Project 1: Reverse TCP/IP proxy (3 sessions)
   - Technology: JavaScript, NodeJS
   - Goals: Warm-up to JavaScript+NodeJS development, server asynchronous programming, callbacks, application development
   - Assessment: In the same date as the 1st partial

4. Lab projects

1. Project 1: Reverse TCP/IP proxy (3 sessions)
2. Project 2: NodeJS and ØMQ application development (4 sessions)
   - Technology: ØMQ, JSON
   - Goals: Distributed application development whose components are processes that communicate, adopting specific roles, using the ØMQ messaging system
   - Assessment: Written exam (2 December)

4. Lab projects

1. Project 1: Reverse TCP/IP proxy (3 sessions)
2. Project 2: NodeJS and ØMQ application development (4 sessions)
3. Project 3: Deployment (3 sessions)
   - Technology: Docker
   - Goals: To understand and manage a multi-component distributed service deployment, using current technologies about containers and deployment configuration / automation.
   - Assessment: In the same date as the 2nd partial.

4. Lab projects

- Lab sessions in DSIC Lab 4 on Tuesdays (10:00-11:30).
- Lab teacher:
  - José Manuel Bernabeu Aubán (josep@iti.upv.es)
- Lab schedule:

Lab project	Lab session	Monday	Tuesday	Wednesday	Thursday	Friday
0		16 September	**10 September**	11 September	12 September	13 September
		23 September	**17 September**	18 September	19 September	20 September
1	1	30 September	**24 September**	25 September	26 September	27 September
	2	7 October	**1 October**	2 October	3 October	4 October
	3	14 October	**15 October**	8 October	10 October	11 October
2	4	21 October	**5 November**	23 October	24 October	8 November
	5	4 November	**12 November**	6 November	7 November	15 November
	6	11 November	**19 November**	13 November	14 November	22 November
	7	18 November	**26 November**	20 November	21 November	29 November
3	8	25 November	**3 December**	27 November	28 November	5 December
	9	9 December	**10 December**	4 December	12 December	13 December
	10	16 December	**17 December**	11 December	19 December	18 December

Index

1. Goals
2. Structure
3. Theory
4. Labs
5. Grading
6. Bibliography

5. Grading

- There are two parts to be considered:
  1. Theory (60%)
  2. Lab projects (40%)
- Those two parts are arranged in three exams:
  1. First partial:
     - Theory: Units 1, 2 and (part of) 3 (30%)
     - Lab projects: Lab 1 (10%)
  2. Lab 2 (20%)
  3. Second partial:
     - Theory: Units (end of 3,) 4, 5, 6 and 7 (30%)
     - Lab projects: Lab 3 (10%)

5. Grading

1. Two partial exams (with second-chance) (80%)
   - Individual objective assessment
     - Multiple choice test
     - Minimum grade (in order to compute the global average): 3 points
   - These exams include the contents of:
     - Theory (60% of the grade)
     - Lab 1 and 3 (20% of the grade)
   - Dates:
     - 21 October (first partial)
     - 9 January (second partial)
     - 27 January (remedial)

5. Grading

1. Two partial exams (with second-chance) (80%)
2. Second lab exam (with second-chance) (20%)
   - Individual written exercise(s). Date: 2 December.
   - A minimum grade of 3 points is required to consider this part in the global grade.

5. Grading

- Summary of dates:
  - 21 October: 1st partial.
  - 2 December: individual written exercise(s) for 2nd lab project.
  - 9 January: 2nd partial.
  - 27 January: remedial (both partials, 2nd lab project).
    - Grading: If the remedial exam is delivered, your final grade will be that obtained in the remedial.

Index

1. Goals
2. Structure
3. Theory
4. Labs
5. Grading
6. Bibliography

6. Bibliography

- No text fitting properly the course material.
  - Although we have provided a student guide for each unit.
    - And a set of short presentations that explain several important concepts.
  - They are available at the PoliformaT site.
- Tons of available material to consult, though.
- General texts and web sites, to further dig into the material presented in theory.

6. Bibliography

- General sources
  - *Distributed Systems: Principles and Paradigms* (2nd Edition). Andrew S. Tanenbaum and Maarten van Steen. Prentice Hall International, 2006.
  - *Distributed Systems: Concepts and Design* (5th Edition). George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair. Addison-Wesley, 2011.
  - http://zguide.zeromq.org. Good source of discussions and structural examples.

6. Bibliography

- Technology
  - Basic sources.
    - http://nodejs.org
    - http://zguide.zeromq.org
    - http://mongodb.org
    - http://docker.com/
- Case studies
  - For each case, the instructor will provide references.