

DPT TELECOMMUNICATIONS SERVICES ET USAGES TELECOMMUNICATIONS, SERVICES & USAGES

INSA Campus LyonTech - Bâtiment Hedy Lamarr 6 avenue des Arts - 69621 VILLEURBANNE Phone 0472436060

Network

Performance Evaluation of Network Systems

IDENTIFICATION		AIMS
CODE :	TC-4-S1-EC-PRF	Be
ECTS :	2.0	sir
HOURS		Th
		CO
Lectures :	14.0 h	
Seminars :	14.0 h	C2
l aboratory :	12.0 h	Ca
Project :	0.0 h	Ca Ca
Teacher-stud	ent	an
contact :	40.0 h	Ca
Personal worl	k : 20.0 h	Kr
Total :	60.0 h	ch

ASSESSMENT METHOD

Mid-term exam (1h, coef 0.25) Final exam (2h, coef 0.75)

TEACHING AIDS

TEACHING LANGUAGE

French

CONTACT

M. BECHKIT Walid walid.bechkit@insa-lyon.fr Phone : 0472438069 Be able to conduct a performance analysis of a networking system, through analytical and simulation tools.

This EC is part of the teaching unit Network Modeling and Architectures (TC-4-S1-MAR) and contributes to the following skills:

C2 Specify, design and model communication networks and protocols Capacity: To be able to model a network system using analytical tools Capacity: To know how to simulate a system using discrete-event simulation Capacity: To know how to evaluate the transient and stationary regimes of a system by using analytical or simulation tools.

Capacity: To know how to size a network by conducting an adequate performance evaluation Knowledge: analytical modeling tools: discrete time Markov chain, continuous time Markov chain, Queueing theory, Queue networks.

Knowledge: equations characterizing the transient and permanent regimes of the analytical models.

Knowledge: random number generation

Knowledge: fundamentals of discrete event simulation and the basics of NS2.

C1 Specify, design and model transmission and signal / image / data processing systems Capacity: To be able to model and evaluate some simple transmission systems (channel access approaches, correcting codes, retransmissions, etc.) using analytical tools Knowledge: analytical modeling tools: discrete time Markov chain, continuous time Markov chain, Queueing theory, Queue networks.

C8 Operate, analyze, improve digital systems

Knowledge: using analytical tools and simulations for performance assessments of already deployed digital systems (capabilities, limits, reliability, bottlenecks, etc.)

A2 Exploit a model of a real or virtual system

Capacity: To know how to develop a scientific approach allowing the analysis of the performances of a system by i) correctly modeling the system and the inputs and by ii) computing and analyzing output performance metrics

A6 Communicate an analysis or a scientific approach with adapted scenarios Capacity: To model some engineering problems using analytical tools (Markov Chain) Knowledge: Know some analytical and simulation tools useful for different engineering problems

In addition, it requires the following skills:

C3 Specify, design and model algorithms and computer programs B2 Work, learn, evolve autonomously B3 Interact with others, work in a team

CONTENT

- Introduction to network modeling and performance analysis
- Introduction to simulation theory
- Markov chains (discrete-time and continuous-time)
- Introduction to queuing theory
- Analysis of single queue : M/M/1, M/M/C/K, ...
- Queueing networks
- Applications to networks performances studies

BIBLIOGRAPHY

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Campus LyonTech La Doua 20, avenue Albert Einstein - 69621 Villeurbanne cedex - France Phone +33 (0)4 72 43 83 83 - Fax +33 (0)4 72 43 85 00 www.insa-lyon.fr [1] Bruno Baynat, Théorie des files d'attente,

Hermès 2000

[2] M. Schwartz, Computer communication : networks, design and analysis, Prentice-Hall

[3] Leonard Kleinrock, Communication Nets, stochastic message flow and delay, Mc Graw-Hill

PRE-REQUISITE

Probablities and statistics (3TC-PBS), Networking (3TC-NET)

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