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2.6.2 Asynchronous Leader Election; 2.7 Concluding Remarks; References; 3 Stochastic Path Properties of Distributed Systems: the CSLTA Approach; 3.1 Introduction; 3.2 The Reference Formalisms for System Definition; 3.3 The Formalism for Path Property Definition: CSLTA; 3.4 CSLTA at work: a Fault-Tolerant Node
3.5 Literature Comparison3.6 Summary and Final Remarks; References; PART II EVALUATION; 4 Failure Propagation in Load-Sharing Complex Systems; 4.1 Introduction; 4.2 Building Blocks; 4.2.1 Coarse-grained Modeling; 4.2.2 Abstract Mechanisms Impacting the Failure Occurrence; 4.2.3 Parametric Distributions Revisited; 4.2.4 Exponential Distribution; 4.2.5 Weibull Distribution; 4.2.6 Lognormal Distribution; 4.2.7 Other Distributions; 4.3 Sand Box for Distributed Failures; 4.3.1 Failure Modes; 4.3.2 LOS and Stress Rupture; 4.4 Summary; References
5 Approximating Distributions and Transient Probabilities by Matrix Exponential Distributions and Functions5.1 Introduction; 5.2 Phase Type and Matrix Exponential Distributions; 5.3 Bernstein Polynomials and Expolynomials; 5.4 Application of BEs to Distribution Fitting; 5.5 Application of BEs to Transient Probabilities; 5.6 Conclusions; References; 6 Worst-Case Analysis of Tandem Queueing Systems Using Network Calculus; 6.1 Introduction; 6.2 Basic Network Calculus Modeling: Per-fl ow Scheduling; 6.2.1 Service Curve; 6.2.2 Arrival Curve; 6.2.3 Delay and Backlog Bounds; 6.2.4 Numerical Examples
6.3 Advanced Network Calculus Modeling: Aggregate Multiplexing6.3.1 Aggregate-multiplexing Schemes; 6.4 Tandem Systems Traversed by Several Flows; 6.4.1 Model; 6.4.2 Loss of the Tightness; 6.4.3 Separated-flow Analysis; 6.5 Mathematical Programming Approach; 6.5.1 Blind Multiplexing; 6.5.2 FIFO Multiplexing; 6.6 Related Work; 6.7 Numerical Results; 6.8 Conclusions; References; 7 Cloud Evaluation: Benchmarking and Monitoring; 7.1 Introduction; 7.2 Benchmarking; 7.2.1 Benchamrking State of Art; 7.2.2 Benchmarking Big Data Services; 7.3 Benchmarking with mOSAIC; 7.4 Monitoring
7.4.1 Monitoring Problem Scenarios

Sommario/riassunto

Distributed systems employed in critical infrastructures must fulfill dependability, timeliness, and performance specifications. Since these systems most often operate in an unpredictable environment, their design and maintenance require quantitative evaluation of deterministic and probabilistic timed models. This need gave birth to an abundant literature devoted to formal modeling languages combined with analytical and simulative solution techniques The aim of the book is to provide an overview of techniques and methodologies dealing with such specific issues in the context of distributed