Service Oriented Computing

Instructor: Dr. Jia Zhang
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Jia Zhang, Ph.D.

- Associate Research Professor
- 14 years of academia experience; 10 years of industry experience
- Research
  - Software engineering in large, center on services computing, with a focus on collaborative data-oriented workflows, SOA, semantic service discovery, and service-oriented software reuse
  - Co-authored textbook titled "Services Computing"; published over 120 refereed journal papers, book chapters & conference papers
  - Associate Editor of IEEE Transactions on Services Computing (TSC) & International Journal of Web Services Research (JWSR)
  - Editor-in-Chief of International Journal of Services Computing (IJSC)
  - Vice Chair of IEEE International Conference on Web Services
- *Course projects are real-world projects*

SOC

Introduction: Principle of Services and Services Computing

Part 1: Foundations of SOC

- Web Services Modeling
- Web Services Publishing and Discovery
- Service-Oriented Architecture (SOA)
- SOA and Web Services Standards
- Solution-Level Quality of Service in SOA

Part 2: Realization of SOC

- Services Discovery, Search, Mining, and Recommendation
- Requirements Driven Services Composition and Collaboration
- Business Process Management and Integration
- Data-Driven Scientific Workflows
- Semantic Web Services

Part 3: Services Engineering

- Enterprise Modeling and Service-Oriented Business Consulting Methodology
- Software as Services and Services as Software
- Internet of Things as a Service
- Cloud Computing and SOA
- Mobile services and engineering

SVC001:
Foundations of Services Computing
Module 1: Introduction to Services Computing

Technical Committee on Services Computing, IEEE Computer Society

BACKGROUND

- Services now account for more than half of the U.S. economy. Services Computing, as a new cross discipline, addresses how to enable IT technology to help people perform business services more efficiently and effectively.

- From a technology foundation perspective, Service Oriented Computing has become a foundational discipline in the modern services industry.

Services Computing: Modern Services Science (MSS) since 2003

- Services Computing is a cross-discipline, studying how to build and leverage software systems as a service to facilitate reusability, scalability, availability, and interoperability, in a networked environment.

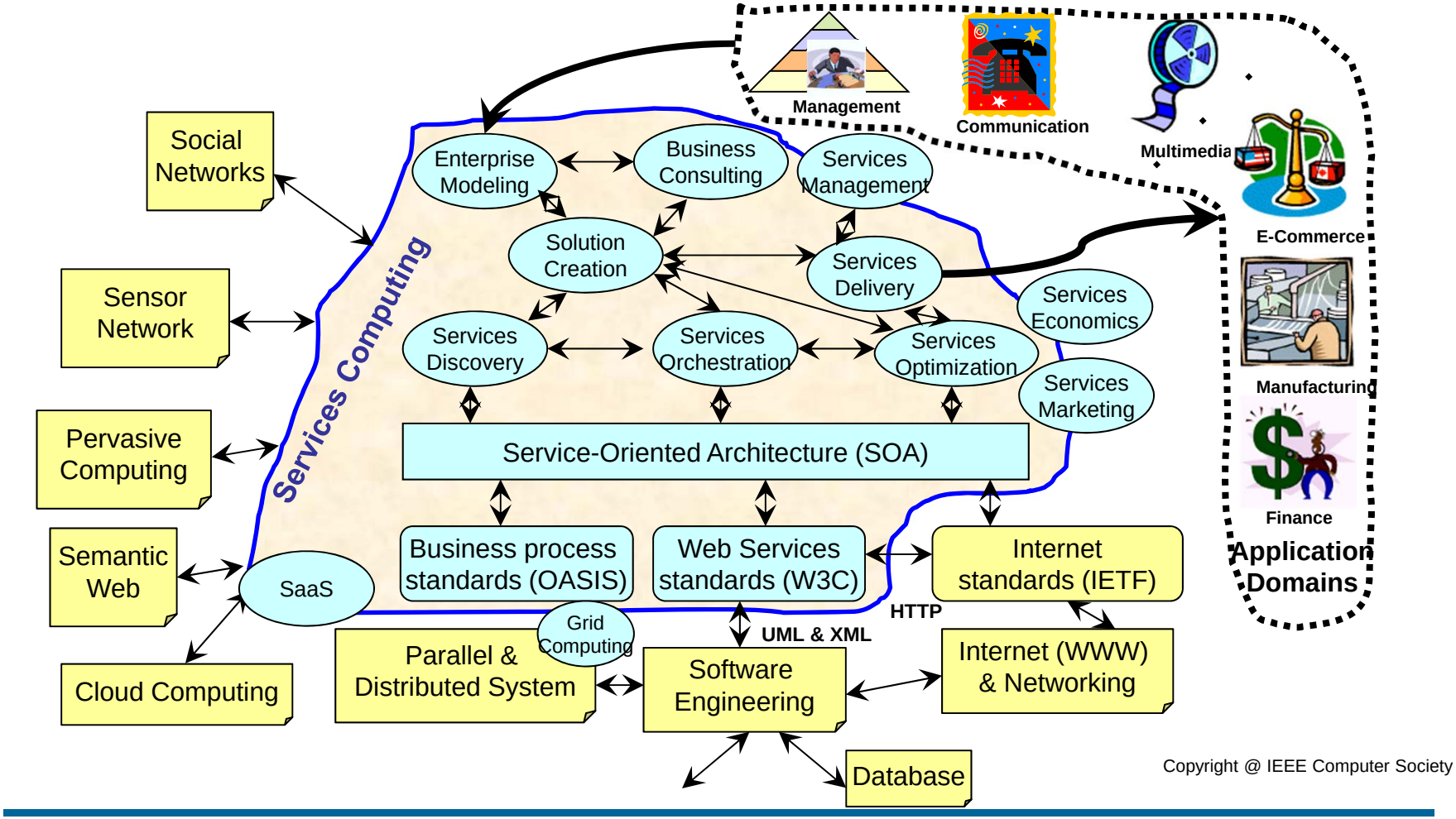
- The goal of Services Computing is to enable IT services and computing technology to perform software services more efficiently and effectively.

12 Years Old Now!

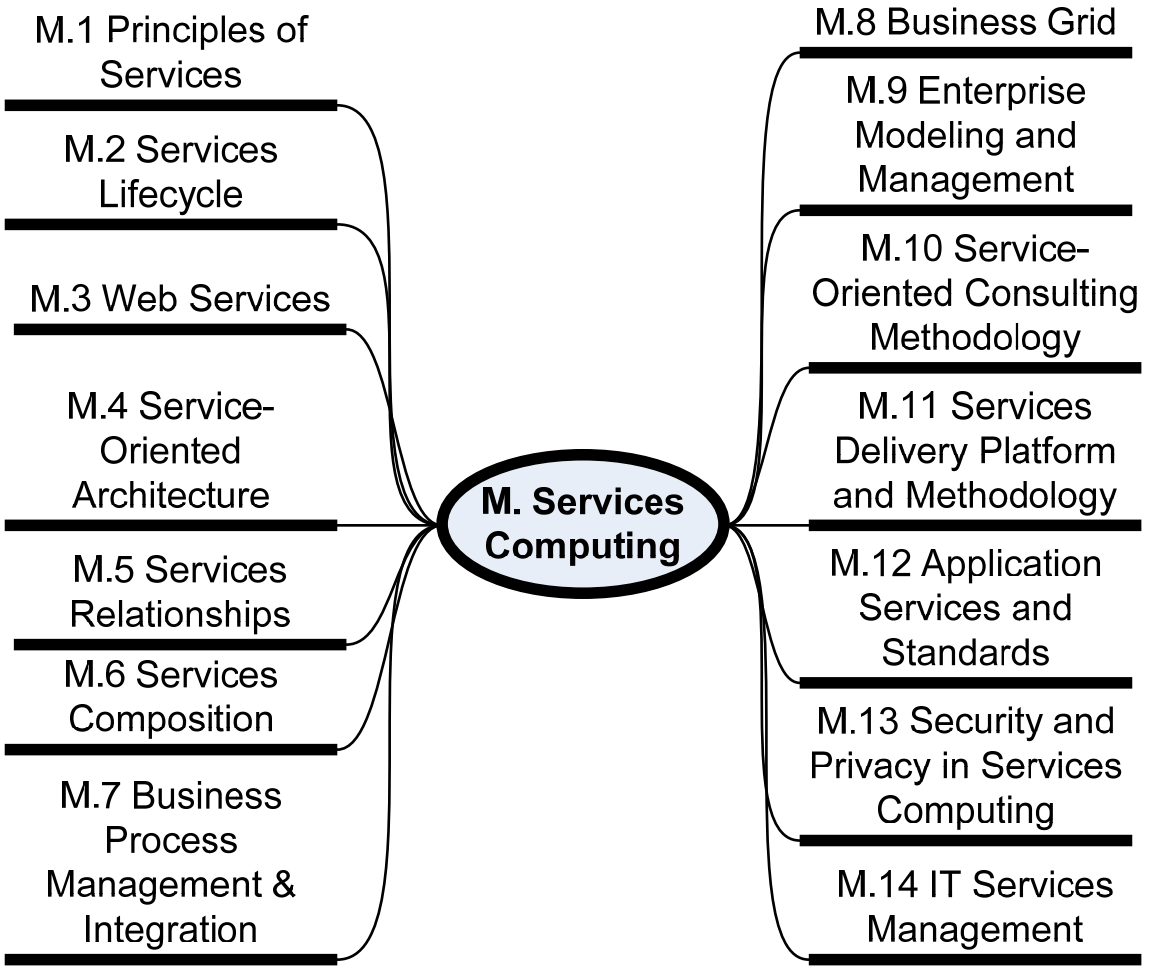
Scope of Services Computing

- This scope of Services Computing covers the whole lifecycle of services innovation research that includes business componentization, services modeling, services creation, services realization, services annotation, services deployment, services discovery, services composition, services delivery, service-to-service collaboration, services mentoring, services optimization, as well as services management.

Services Computing Landscape



SERVICES COMPUTING KNOWLEDGE AREAS



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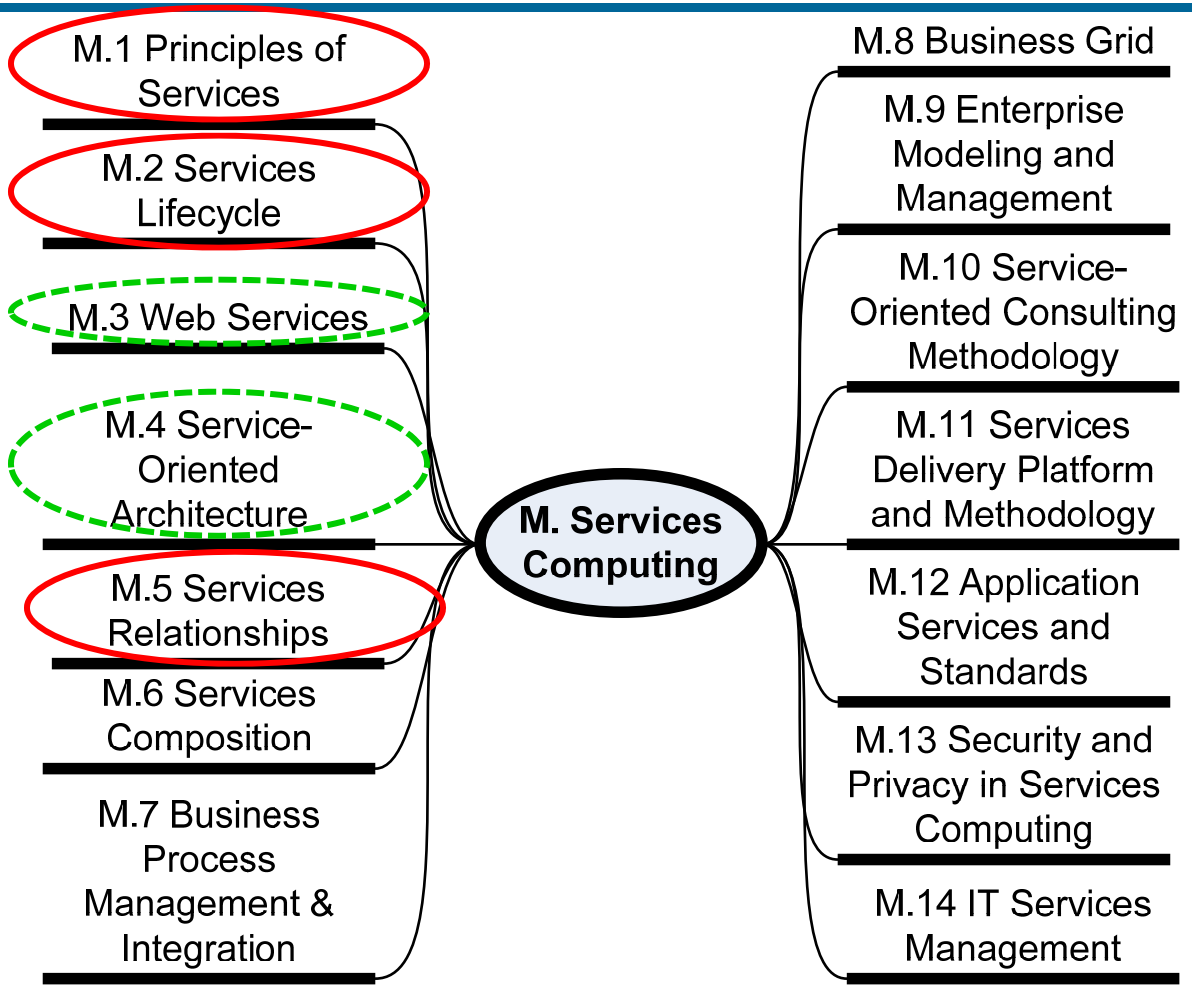
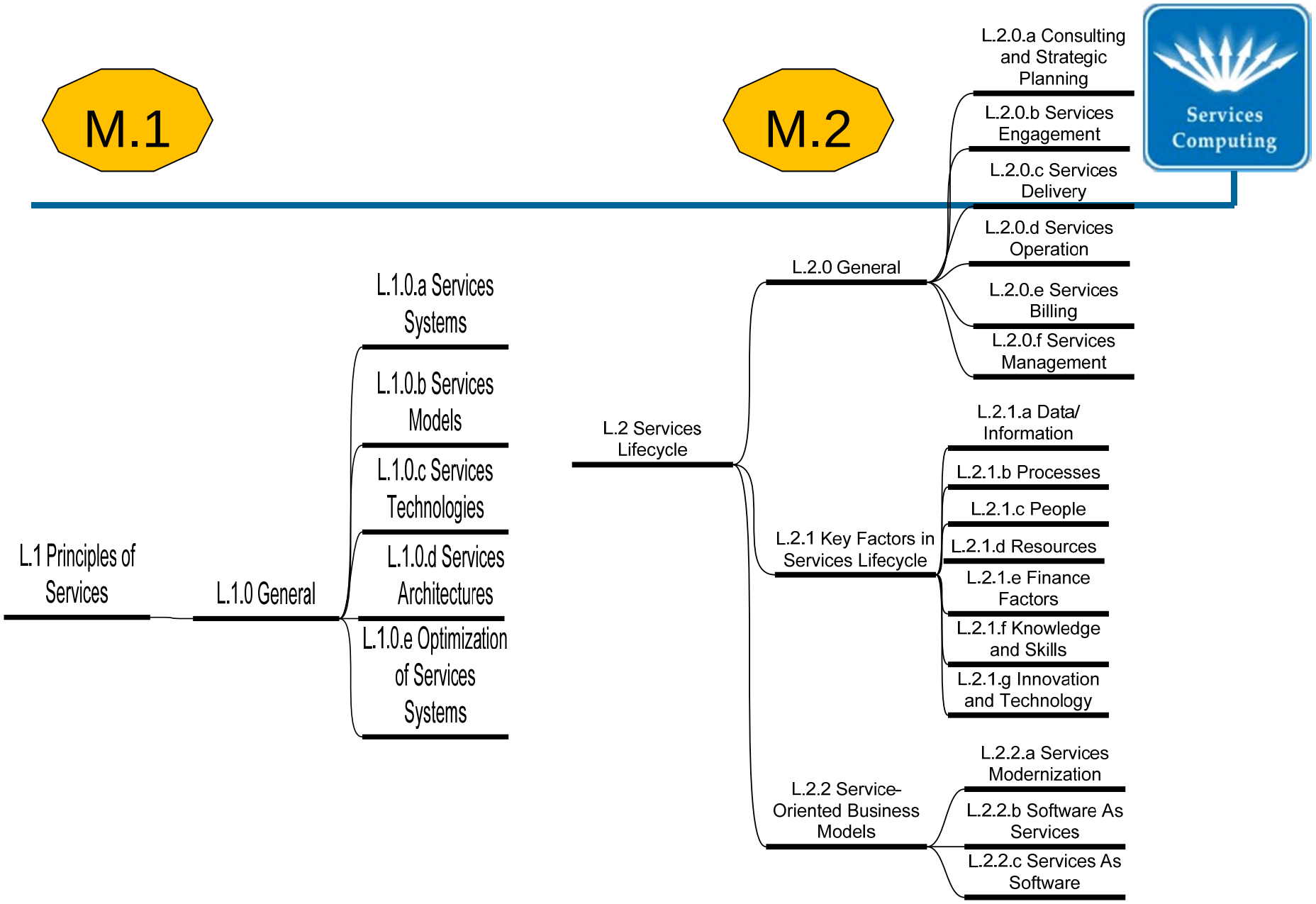
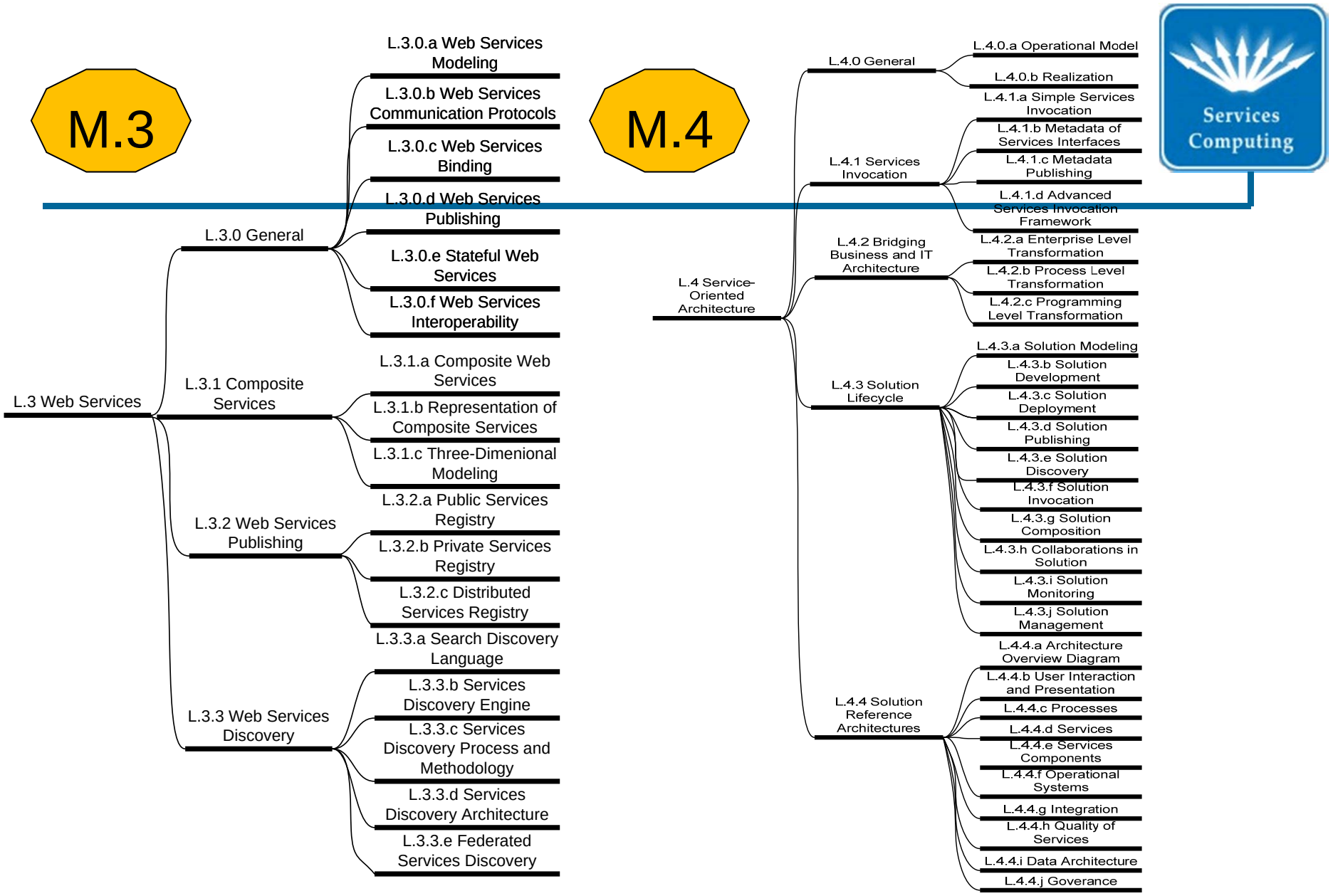
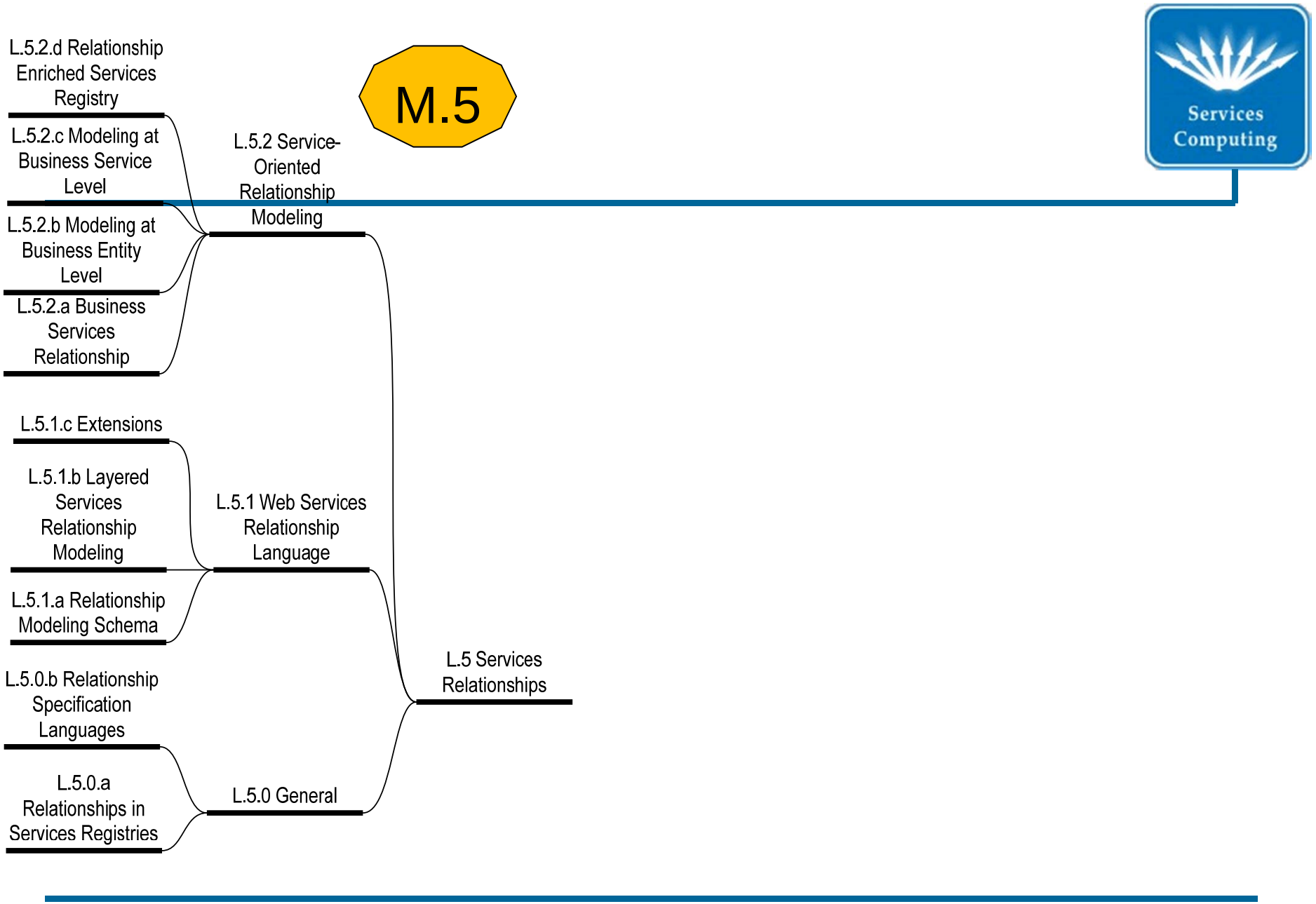
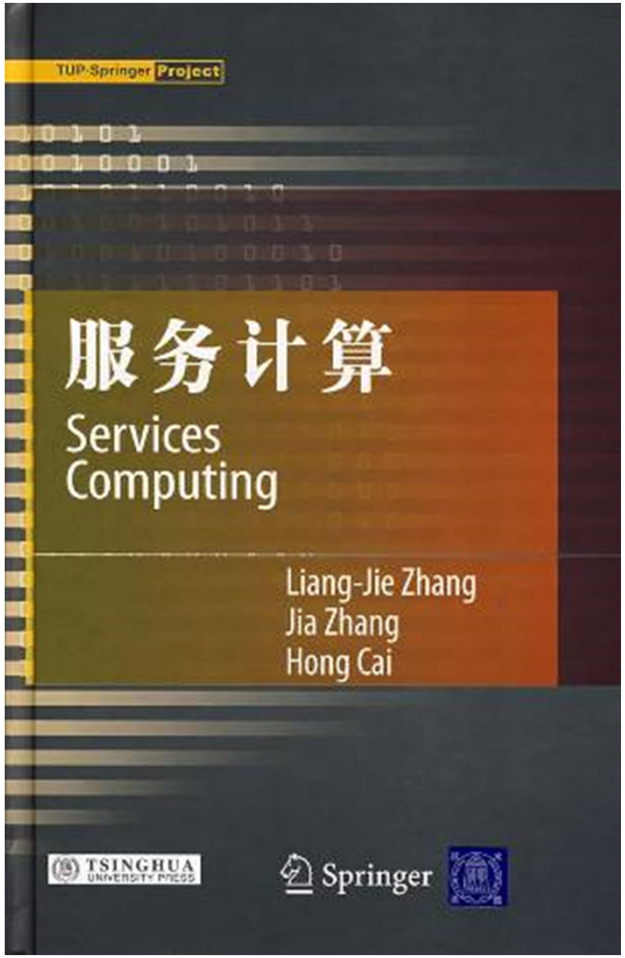



M.1
M.2
Services Computing
L.1 Principles of Services
L.1.0 General
L.1.0.a Services Systems
L.1.0.b Services Models
L.1.0.c Services Technologies
L.1.0.d Services Architectures
L.1.0.e Optimization of Services Systems
L.2 Services Lifecycle
L.2.0 General
L.2.0.a Consulting and Strategic Planning
L.2.0.b Services Engagement
L.2.0.c Services Delivery
L.2.0.d Services Operation
L.2.0.e Services Billing
L.2.0.f Services Management
L.2.1 Key Factors in Services Lifecycle
L.2.1.a Data/ Information
L.2.1.b Processes
L.2.1.c People
L.2.1.d Resources
L.2.1.e Finance Factors
L.2.1.f Knowledge and Skills
L.2.1.g Innovation and Technology
L.2.2 Service-Oriented Business Models
L.2.2.a Services Modernization
L.2.2.b Software As Services
L.2.2.c Services As Software


M.3
L.3.0.a Web Services Modeling
L.3.0.b Web Services Communication Protocols
L.3.0.c Web Services Binding
L.3.0.d Web Services Publishing
L.3.0.e Stateful Web Services
L.3.0.f Web Services Interoperability
L.3.0 General
L.3.1.a Composite Web Services
L.3.1.b Representation of Composite Services
L.3.1.c Three-Dimenional Modeling
L.3.1 Composite Services
L.3.2.a Public Services Registry
L.3.2.b Private Services Registry
L.3.2.c Distributed Services Registry
L.3.2 Web Services Publishing
L.3.3.a Search Discovery Language
L.3.3.b Services Discovery Engine
L.3.3.c Services Discovery Process and Methodology
L.3.3.d Services Discovery Architecture
L.3.3.e Federated Services Discovery
L.3.3 Web Services Discovery
L.3 Web Services
M.4
L.4.0.a Operational Model
L.4.0.b Realization
L.4.0 General
L.4.1.a Simple Services Invocation
L.4.1.b Metadata of Services Interfaces
L.4.1.c Metadata Publishing
L.4.1.d Advanced Services Invocation Framework
L.4.1 Services Invocation
L.4.2.a Enterprise Level Transformation
L.4.2.b Process Level Transformation
L.4.2.c Programming Level Transformation
L.4.2 Bridging Business and IT Architecture
L.4.3.a Solution Modeling
L.4.3.b Solution Development
L.4.3.c Solution Deployment
L.4.3.d Solution Publishing
L.4.3.e Solution Discovery
L.4.3.f Solution Invocation
L.4.3.g Solution Composition
L.4.3.h Collaborations in Solution
L.4.3.i Solution Monitoring
L.4.3.j Solution Management
L.4.3 Solution Lifecycle
L.4.4.a Architecture Overview Diagram
L.4.4.b User Interaction and Presentation
L.4.4.c Processes
L.4.4.d Services
L.4.4.e Services Components
L.4.4.f Operational Systems
L.4.4.g Integration
L.4.4.h Quality of Services
L.4.4.i Data Architecture
L.4.4.j Goverance
L.4.4 Solution Reference Architectures
L.4 Service-Oriented Architecture
Services Computing


M.5
Services Computing
L.5.2.d Relationship Enriched Services Registry
L.5.2.c Modeling at Business Service Level
L.5.2.b Modeling at Business Entity Level
L.5.2.a Business Services Relationship
L.5.2 Service-Oriented Relationship Modeling
L.5.1.c Extensions
L.5.1.b Layered Services Relationship Modeling
L.5.1.a Relationship Modeling Schema
L.5.1 Web Services Relationship Language
L.5.0.b Relationship Specification Languages
L.5.0.a Relationships in Services Registries
L.5.0 General
L.5 Services Relationships

TEXT BOOK



- Liang-Jie Zhang, Jia Zhang, Hong Cai, Services Computing, July 2007, Springer Verlag and Tsinghua University Press