

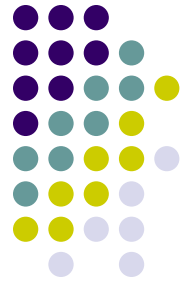
# **Welcome to** **SENG 480B / CSC 485B / CSC 586B** **Self-Adaptive and** **Self-Managing Systems**

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Department of Computer Science  
University of Victoria

<http://courses.seng.uvic.ca/courses/2013/summer/seng/480b>  
<http://courses.seng.uvic.ca/courses/2013/summer/csc/485b>  
<http://courses.seng.uvic.ca/courses/2013/summer/csc/586b>

# Announcements

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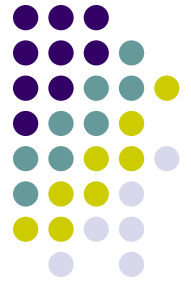
- Midterm grading
  - 3/4 done 😊
  - Should be graded by Tue, July 16
- Group presentations of A3
  - Tue, July 16
  - Undergrads should present
- Grad student presentations
  - July 23 – July 31
- Review for final exam
  - Wed, Aug 7
- Last day of classes
  - Wed, Aug 7
- Final exam
  - Tue, Aug 13, 9:00-12:00 am in ECS 124
  - Closed books, closed notes
  - Materials: entire course
  - Format: like midterm

# Graduate Student Research Paper Presentations



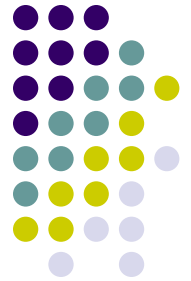
- Garlan, D., Cheng, S.-W., Huang, A.-C., Schmerl, B., Steenkiste, P.: Rainbow: Architecture-Based Self-Adaptation with Reusable Infrastructure. *IEEE Computer* 37(10):46-54 (2004) — **Angela Rook, July 23**
- Kramer, J., Magee, J.: Self-Managed Systems: An Architectural Challenge. In: *ACM/IEEE International Conference on Software Engineering 2007 Future of Software Engineering (ICSE)*, pp. 259-268 (2007) — **Pratik Jain, July 23**
- Oreizy, P., Medvidovic, N., Taylor, R.N.: Runtime Software Adaptation: Framework, Approaches, and Styles. In: *ACM/IEEE International Conference on Software Engineering (ICSE 2008)*, pp. 899-910 (2008) — **Alessia Knauss, July 24**
- Brun, Y., Di Marzo Serugendo, G., Gacek, C. Giese, H. Kienle, H.M., Litoiu, M., Müller, H.M., Pezzè, M., Shaw, M.: *Engineering Self-Adaptive Systems through Feedback Loops*. SE for Self-Adaptive Systems, pp. 48-70 (2009) — **Samra Ramandeep, July 24**
- Kaushik, R.T., Cherkasova, L., Campbell, R.H., Nahrstedt, K.: Lightning: self-adaptive, energy-conserving, multi-zoned, commodity green cloud storage system, *ACM International Symposium on High Performance Distributed Computing (HPDC 2010)*, 332-335 (2010) — **Andi Bergen, July 26**

# Graduate Student Research Paper Presentations

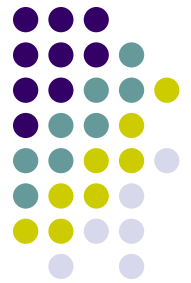


- Villegas, N.M., Müller, H.A., Tamura, G., Duchien, L., Casallas, R.: A framework for evaluating quality-driven self-adaptive software systems. In: *Proc. 6th Int. Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS 2011)*, pp. 80-89 (2011) — **Lorena Castaneda, July 30**
- Ebrahimi, S., Villegas, N.M., Müller, H.A., Thomo, A.: SmarterDeals: a context-aware deal recommendation system based on the SmarterContext engine. *CASCON 2012*: 116-130 (2012) — **Nina Taherimakhsousi, July 30**
- McKinley, P.K., Sadjadi, M., Kasten, E.P., Cheng, B.H.C.: Composing Adaptive Software. *IEEE Computer* 37(7):56-64 (2004) — **Carlos Gomez, July 31**
- Tewari, V., Milenkovic, M.: Standards for Autonomic Computing, *Intel Technology Journal*, 10(4):275-284 (2006) — **Nitin Goyal, July 31**

# Guidelines for Grad Presentations



- Format of presentation
  - Presentation 15-20 mins
  - Q&A 5 mins
  - Practice talk (!)
- Slides
  - High quality
  - Submit slides 2 days before presentation to instructor for approval
  - Submit final slides 1 day after presentation for posting on website
- Talk outline
  - Motivation
  - Problem
  - Approach
  - Relation to what we heard in the course so far
  - Contributions of the paper



# Rise of the Dynamic Value Set

- The value chains of today are the result of linked individual business tasks that come together to form a valuable end product
  - Just like a physical assembly line, each participant in the value chain contributes something to increase the value of the end product for the end user
  - Although these value chains have become increasingly distributed, they still tend to be predictable, structured and linear
- The combination of participating service providers is changing dynamically based on who is in the best position to perform a given task at a given time
  - These service providers themselves are becoming interconnected with one another to the point that mapping their relationships yields more of a net than the traditional linear chain
  - Familiar value chains are morphing into dynamic value nets
- The workings of the value net are orchestrated by the organization that delivers the end product to market under its own brand name
  - Orchestration itself may very well be the lead brand organization's unique value add.

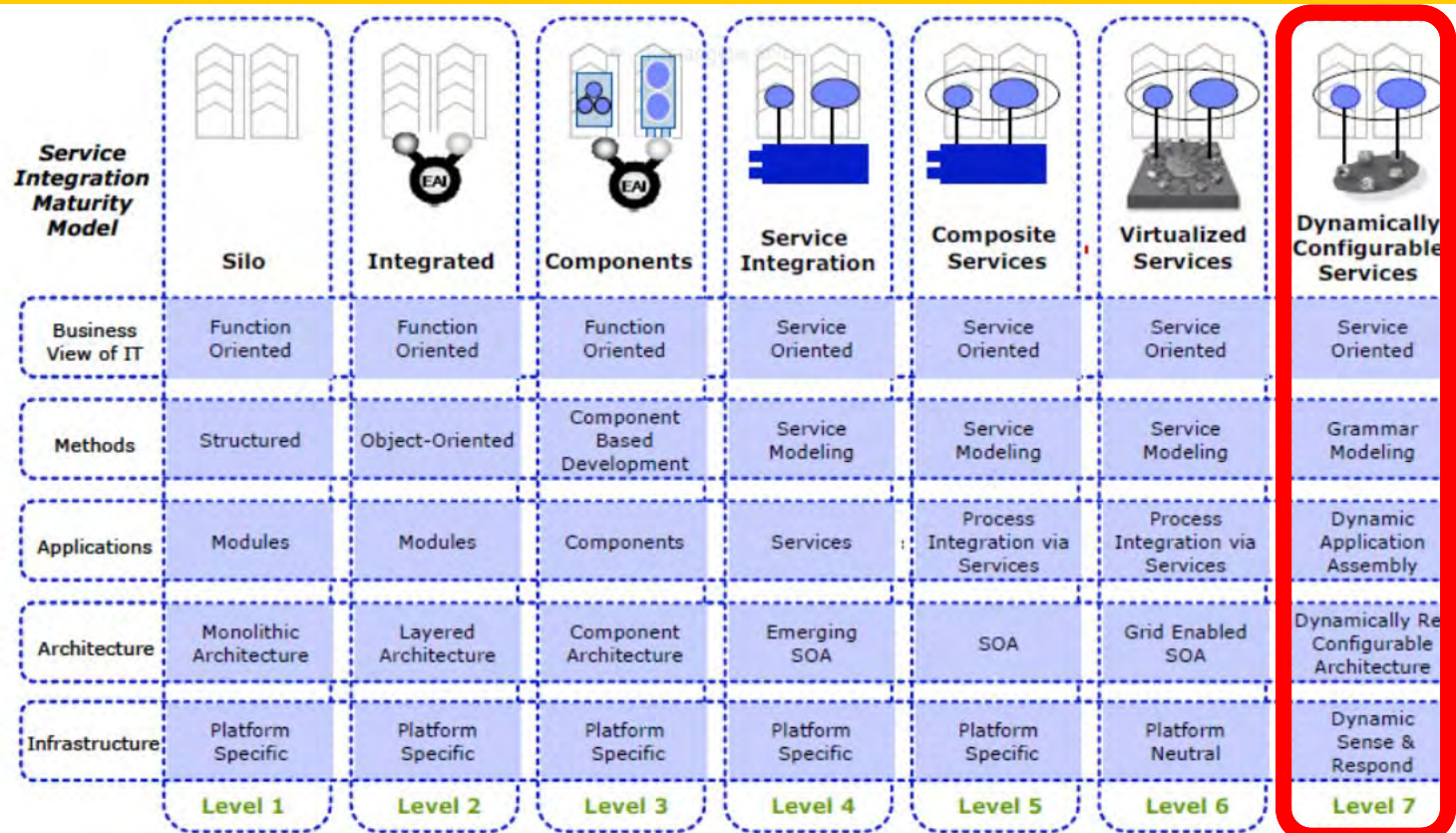
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**Steve Mills, VP IBM Software Group: The Future of Business, White Paper, June 2007**

# IBM Global Services Service Integration Maturity Model (SIMM)

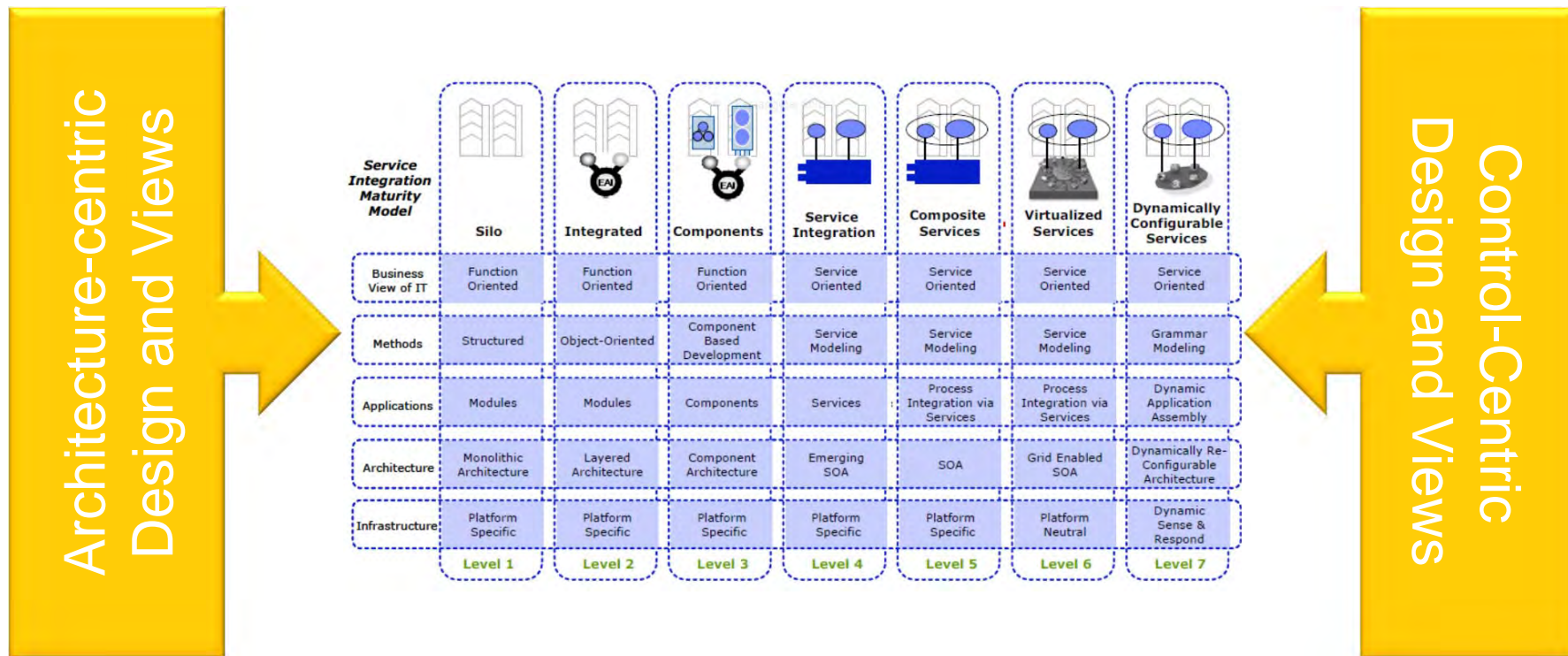


Ultimate goal: dynamically configurable services



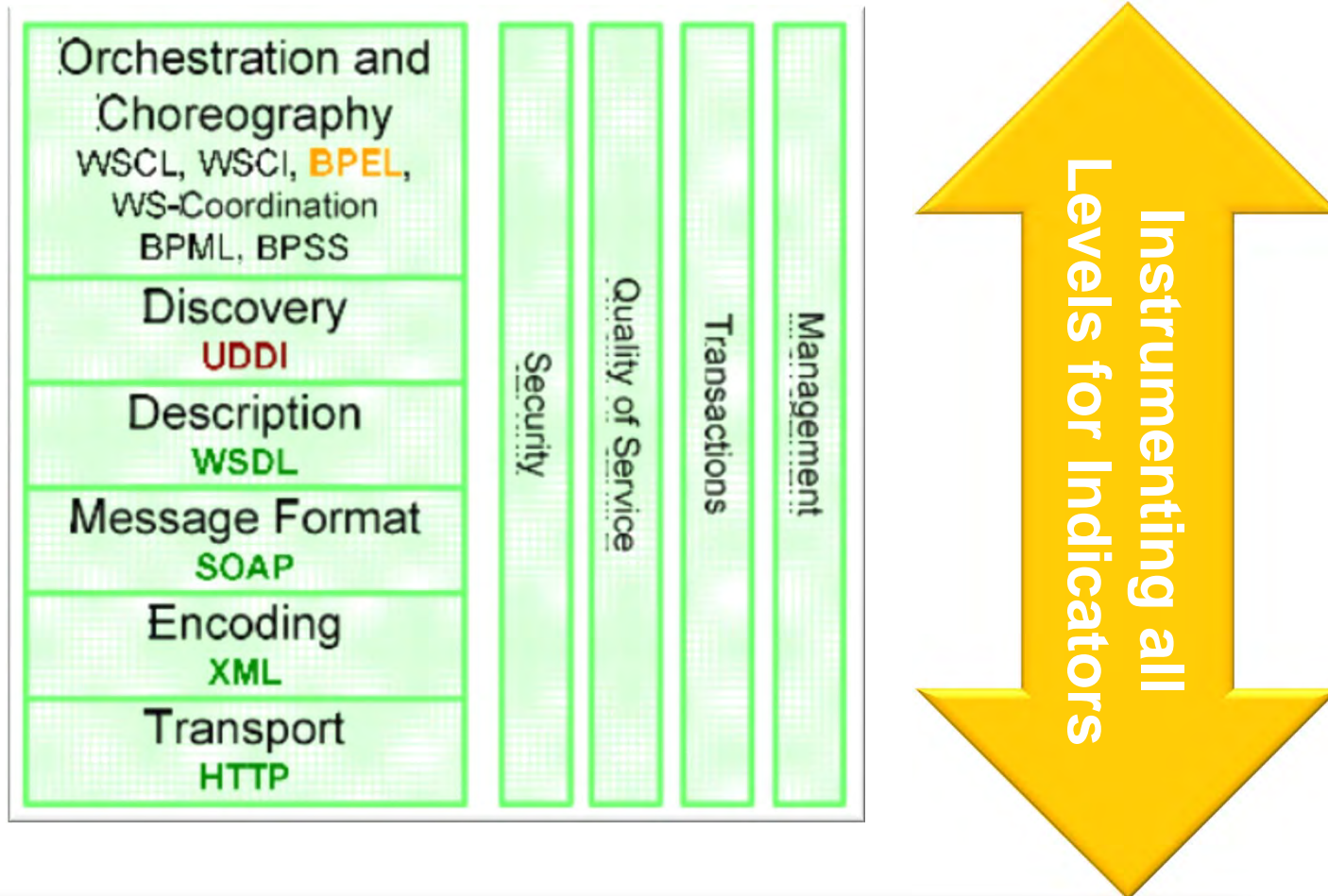
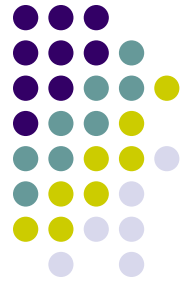


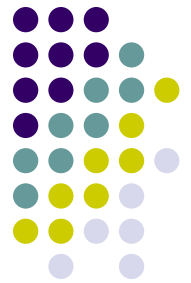
# Architecture-centric vs. Control-centric SOA Orchestration





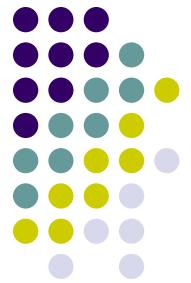
# Key Performance Indicators (KPI) and quality-of-service Indicators





# SOA Governance

- Governance has been rated as the main inhibitor of SOA adoption
- SOA governance provides a set of policies, rules, and enforcement mechanisms for developing, using and evolving service-oriented systems, and for analysis of their business value
- SOA governance includes policies, procedures, roles and responsibilities for design-time governance and runtime governance

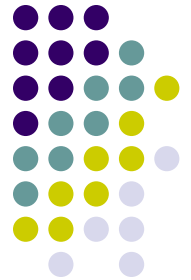


# SOA Governance Types

- Design-time governance
  - Includes elements such as rules for strategic identification of services, development, and deployment of services; reuse; and legacy system migration to services
  - Enforces consistency in use of standards, SOA infrastructure and processes
- Run-time governance
  - Enforces rules to ensure that services are executed only in ways that are legal and that important runtime data is logged
  - Service level agreements (SLAs) including runtime validation of contractual specifications on performance, throughput, and availability; the use of automated metrics for tracking and reporting; and problem management

# Brief Side Note ...

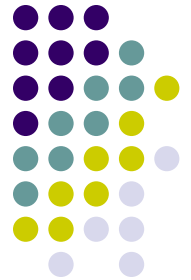
## Compliance vs. Conformance



- **Compliance implies adherence to a standard or regulation**
  - You either pass or fail
  - A company can be in compliance with Sarbanes-Oxley auditing requirements
  - A browser can comply with a specific security requirement by providing 128-bit security and TLS encryption
  - Service delivery is compliant with an SLA
- **Conformance describes how well a given implementation matches or does not match a standard or a reference**
  - A conformance testing suite that returns results that certain aspects of an implementation match a reference implementation
  - A Web services implementation can conform with the WS-I basic interoperability profile
  - Service delivery is conformance with an SLA depends on the importance of the customer
- A lack of conformance does not necessarily imply a value judgment the way that lack of compliance with a law or regulation does

**Keep in mind: Whenever we talk about “compliance,” we often really mean “conformance.”**

# Need For Governance & Adaptation in Service-Oriented Systems



- Great benefits can be realized when an enterprise transforms its architecture to SOA because of the distributed and flexible nature of services
- But chief architects have a hard time to manage the entire service portfolio across various business lines
- Understanding, controlling, and managing uncertainty and run-time dynamics is crucial given the ever-changing business environment
- As a result, service-oriented systems resort to self-adaptation and self-management for dynamic service management and service composition