

Towards Service-oriented architecture for a local health integration network in Canada

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SOA IN HEALTHCARE CONFERENCE

SOA Roadmap to Integration: Architecting Interoperability in Healthcare

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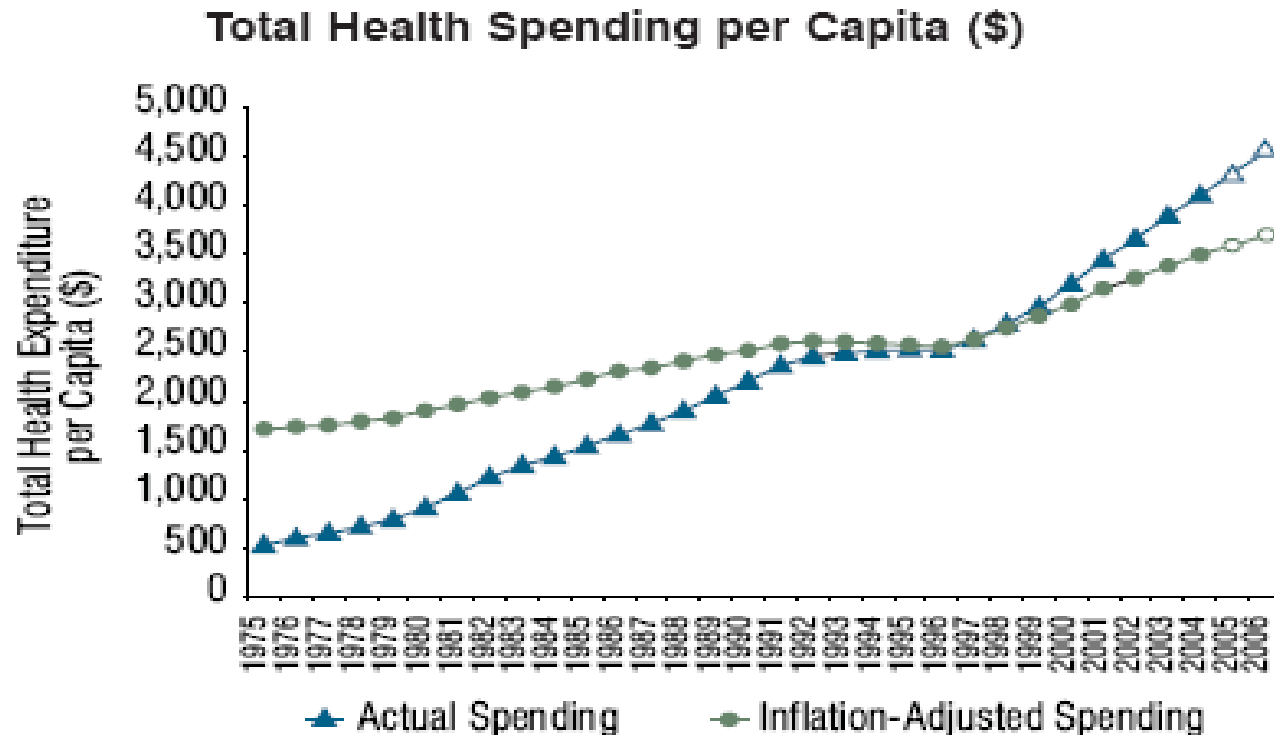
Agenda

- Healthcare in Canada
- Local health integration networks (LHIN)
- Need for SOA
- Case study of a LHIN
- Major issues

Healthcare in Canada

- Publicly funded system
- Universal and comprehensive coverage for medically necessary hospital and physician services
- Health service financing
 - Public (municipal, provincial, and federal) about 70%
 - Private (health insurance, out of pocket payments) about 30%

Healthcare in Canada



Healthcare cost in Canada (Ottawa: CIHI, 2007)

LHINs

- 14 Not-for-profit corporations
- Created by the Ontario government in March 2006
- Shift from a centralized model to a regional model
- Mandated for planning, identifying, and funding health services and priority programs for their regions

Case study: Erie St. Clair LHIN

- Smallest of the 14 LHINs
- Annual budget of \$900 million
- Serving population of 649,000
- Region: Chatham-Kent, Sarnia/Lambton and Windsor/Essex (South-western Ontario)

Case study: Erie St. Clair LHIN

- Oversees 88 institutions in the region
 - Hospitals
 - long-term care centres and assisted living services
 - mental health and addiction agencies
 - community support services
 - community care access centres
 - and community health centres.

Case study: Erie St. Clair LHIN

- Launched Integrated Health Service Plan2 (IHSP2) for 2010-2013
- IHSP 2's five strategic objectives
 - improved outcomes in
 - alternate level of care
 - emergency department care
 - diabetes management
 - mental health addiction
 - rehabilitation care and interventions

Framework for service outcomes

- Improved access
- Improved quality
- Cost effectiveness
- Co-ordination

Success measure

LHIN Triple Aims based on the IHI approach

Dimension/Aim	Measured with
Population	Health adjusted life expectancy; Composite health risk appraisal score; Hospital and emergency department utilization for ambulatory care sensitive conditions; Disease burden
Individual	Surveys to assess a patient's overall experience in emergency department care, integrated diabetes care, and alternate level of care
Cost	Cost per member of the population per month; Hospital and emergency department utilization cost

SOA for the LHIN

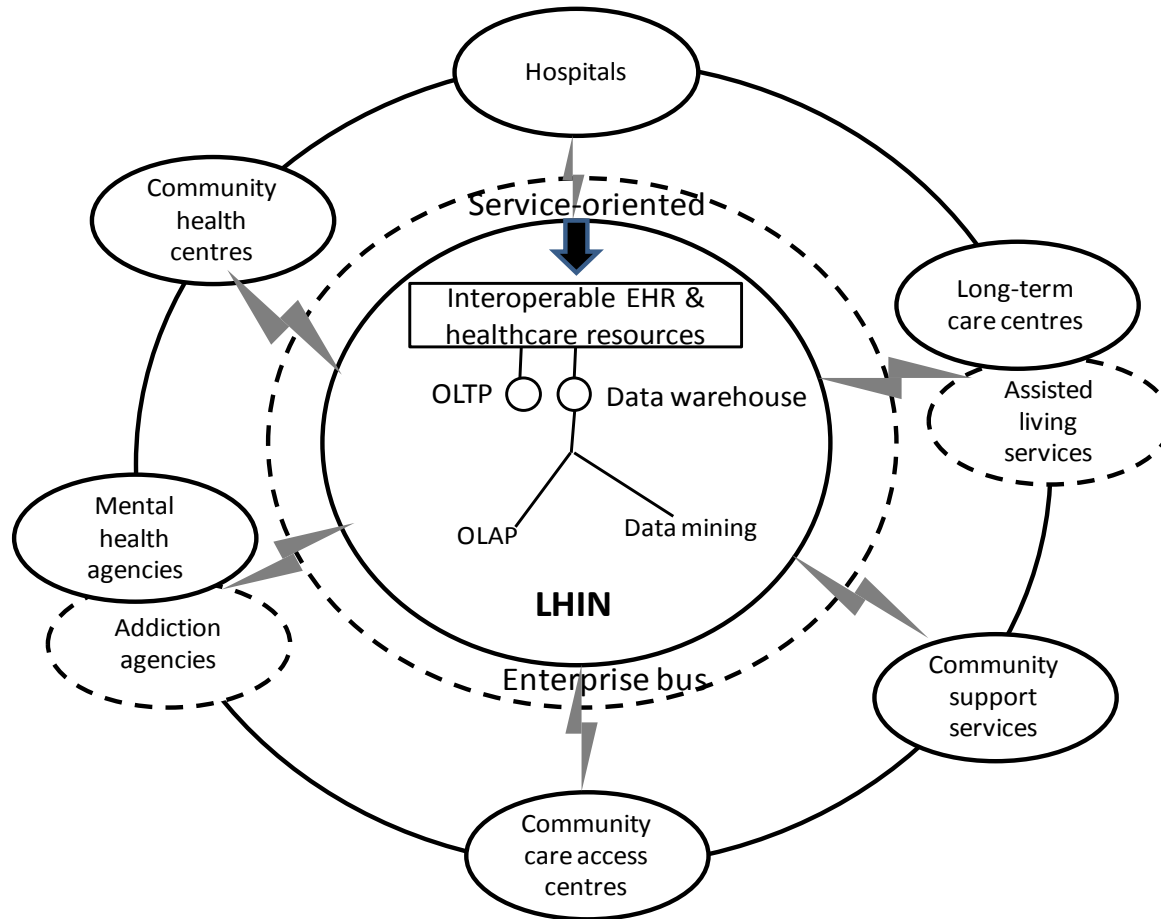
SOA is defined as

“A paradigm for organizing and utilizing distributed capabilities that may be under control of different ownership domains. It provides a uniform means to offer, discover, interact with and use capabilities to produce desired effects consistent with measurable preconditions and expectations” (OASIS, 2006).

SOA for LHIN

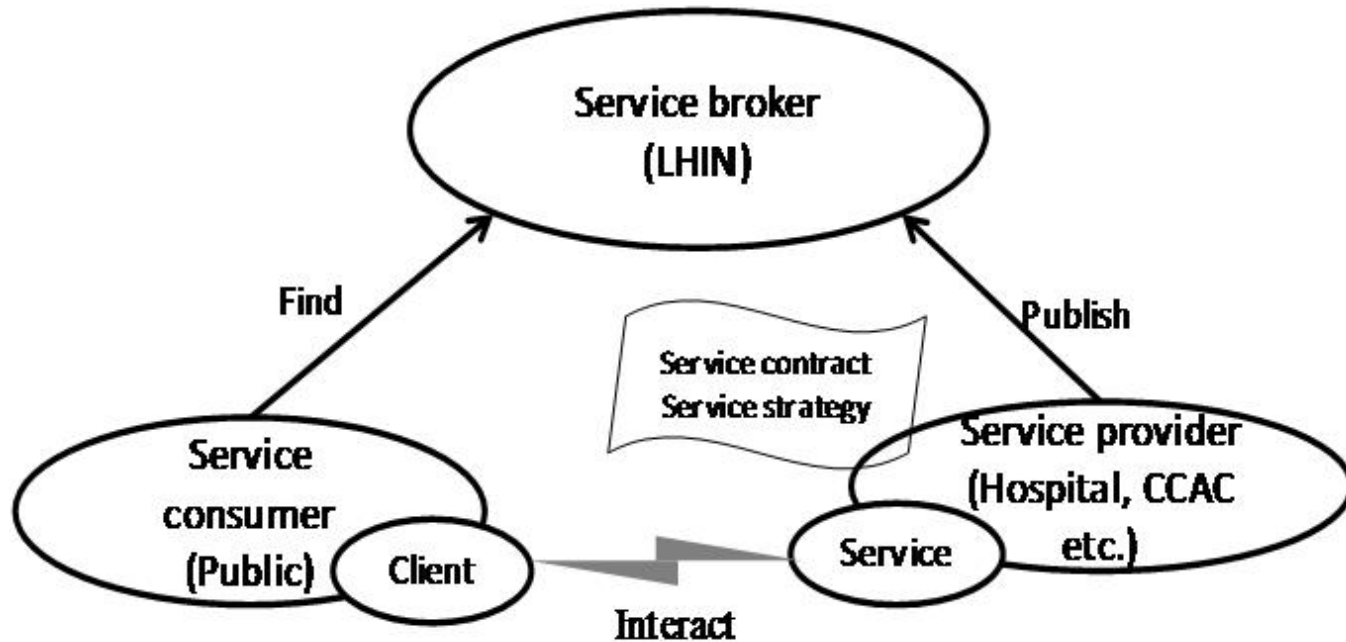
<i>Member agencies</i>	<i>Services</i>
Hospitals	Primary care, emergency, outpatient
Long-term care centres	24-hour nursing care and supervision
Assisted living services	Assistance with activities of daily living
Community support services	Independence while living at home
Community care access centres	Service co-ordinator and planner
Mental health agencies	Dealing with mental illness
Addiction agencies	Dealing with drug, alcohol & other abuse
Community health centres	Primary health & health promotion

SOA for the LHIN



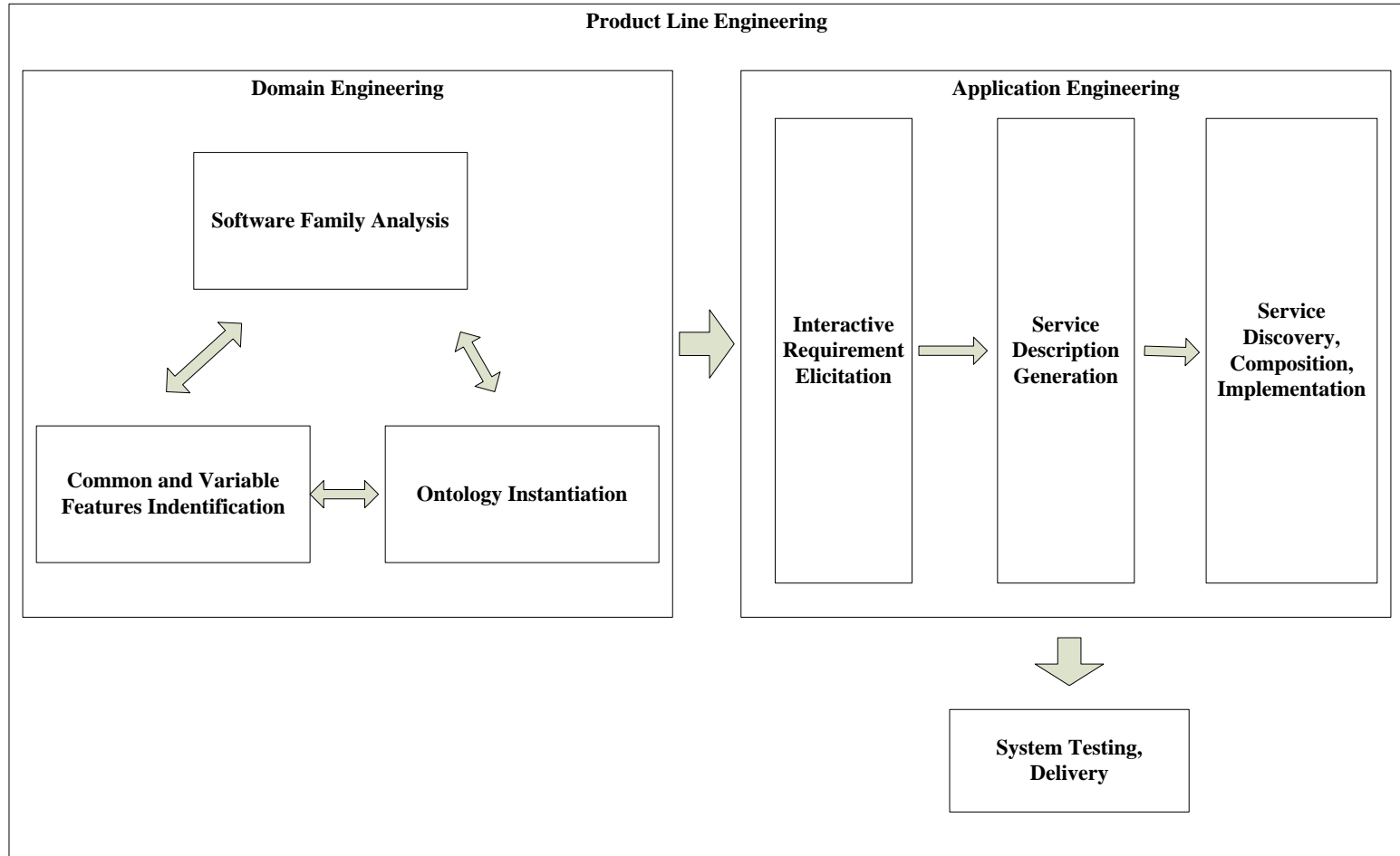
Proposed architecture for the LHIN (Bhandari and Snowdon, 2011)

SOA for LHIN

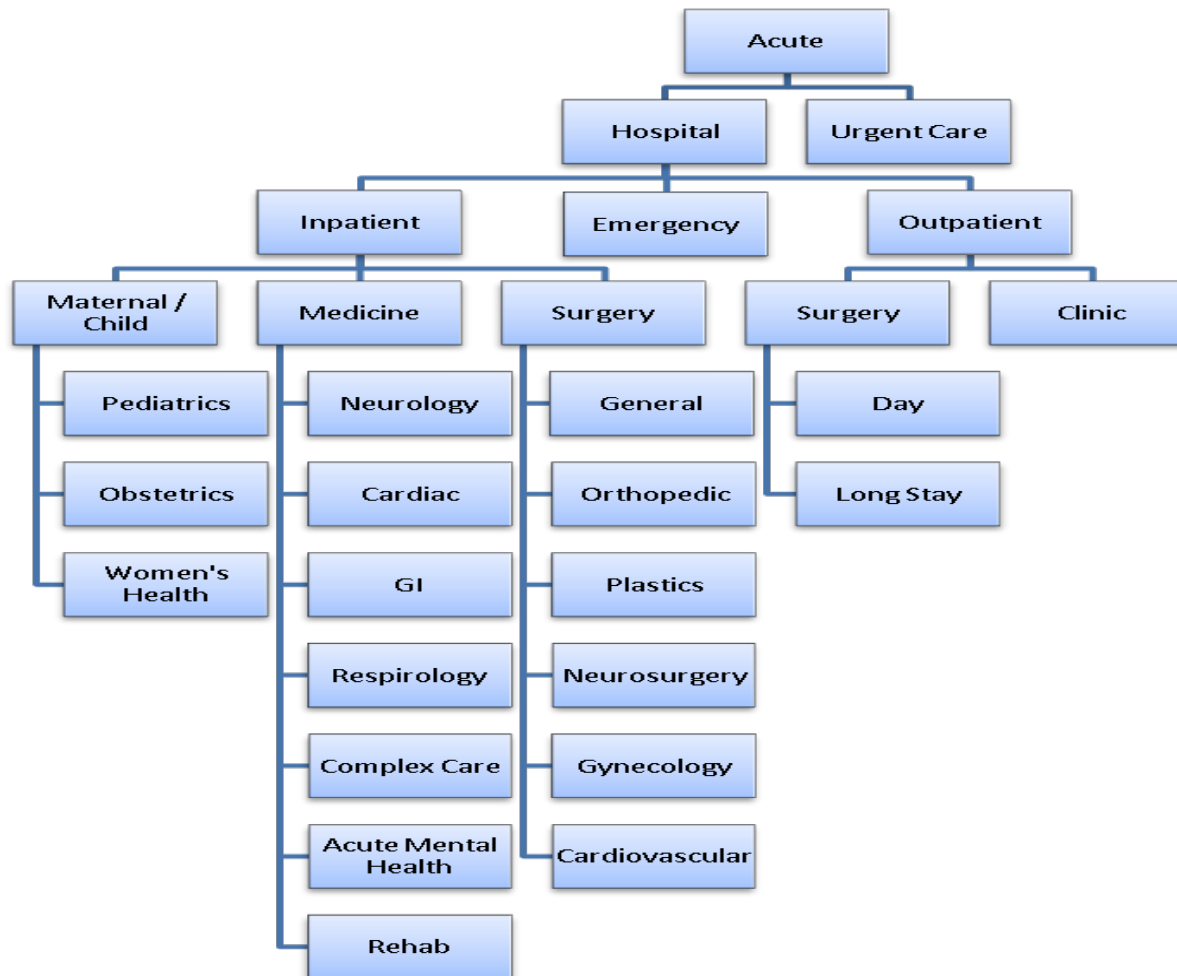


Relationship between the LHIN, member agencies and the public in the SOA

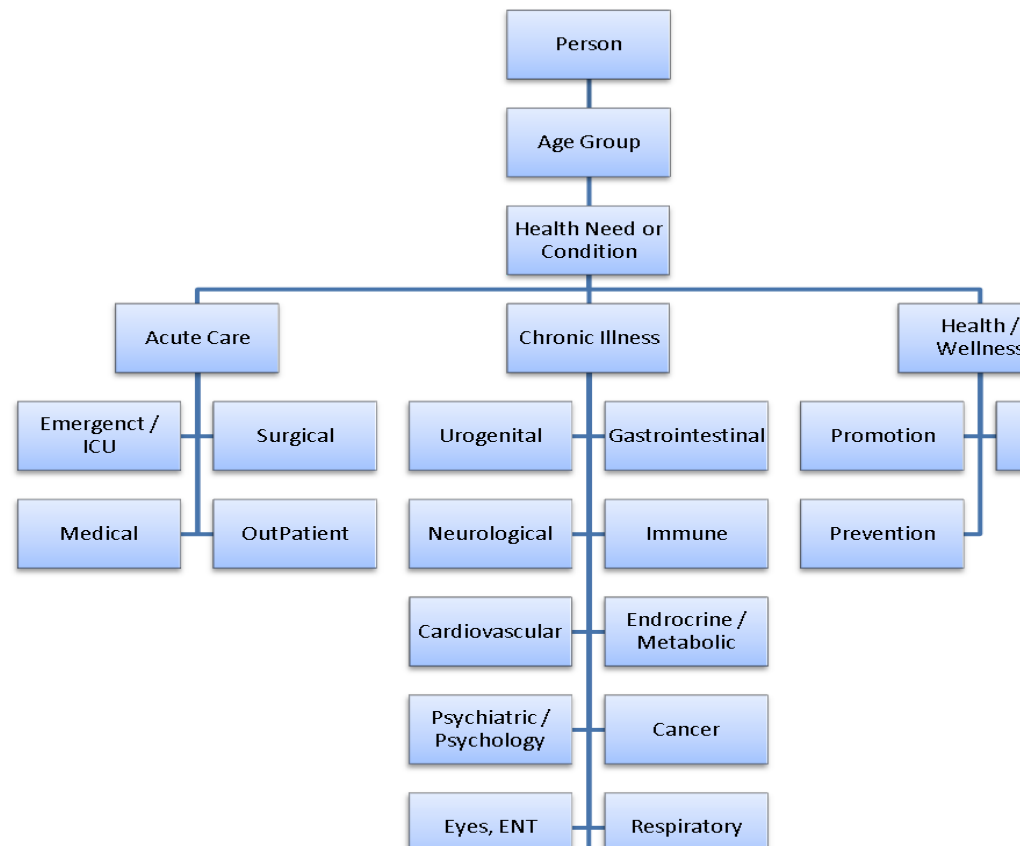
System development approach: SPL



Service ontology - example



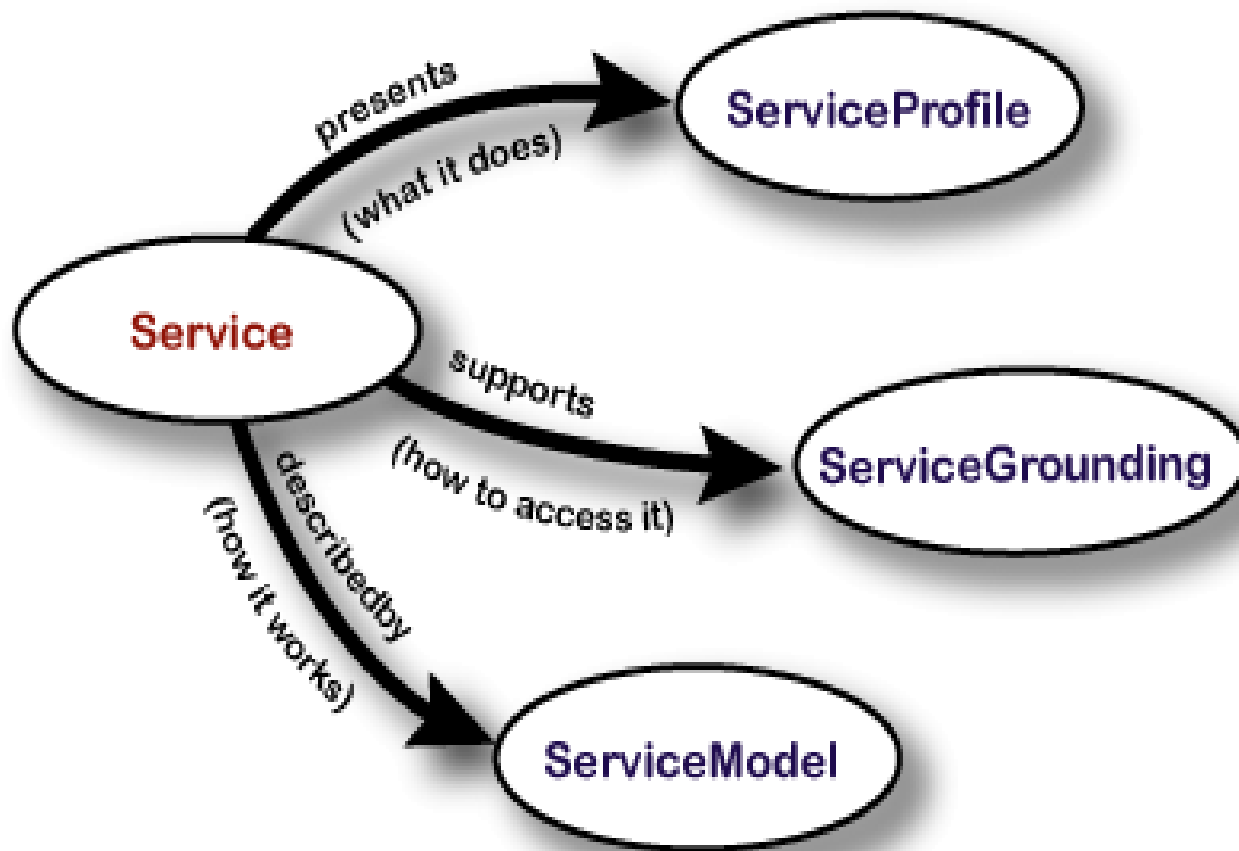
Service ontology - example



Tools for service ontology generation

- Interactive RE
 - Eclipse IDE 3.6 for coding and debugging
 - Java 6.0 on x86 platform for programming
- Ontology
 - Protégé ontology editor 4.2
 - Pellet 2.2.2 for ontology reasoning

OWL-S for service discovery



Challenges in SOA adoption

- Difficult to get the management buy-in
- Not sure what to do with the legacy systems
- Difficulty of deciding on the accessibility and granularity of services and security
- Uncertainty regarding the successful transition to the SOA

References

- Bhandari, G., and Snowdon, A. (2011). Design of a patient-centric, service-oriented health care navigation system for a local health integration network, *Behaviour & Information Technology*, 1-11, First published on: 04 May 2011 (iFirst).
- Erie St. Clair LHIN (<http://www.eriestclairlhin.on.ca/>)
- IHSP 2 (<http://www.esclhinhsp2.ca/>)
- IHI- The Institute for Healthcare Improvement (www.ihl.org)
- LHIN (<http://www.lhins.on.ca/>)
- OASIS. (2006). A reference model for service-oriented architecture, White Paper, *Service-Oriented Architecture Reference Model Technical Committee*. Billerica, MA: Organization for the Advancement of Structured Information's Standards.