Chapter 6

A Look at Service-Driven Industry Models

The Enterprise Service Model
The Virtual Enterprise Model
The Capacity Trader Model
The Enhanced Wholesaler Model
The Price Comparator Model
The Content Provider Model
The Job Market Model
The Global Trader Model
The convergences of modern SOA practices with service technologies have been creating opportunities to form new business relationships and operational models. Intended to inspire the construction of custom models for organizations in any industry, a series of innovative models that highlight the potential of next generation SOA is explored in this chapter.

**The Enterprise Service Model**

The enterprise service model combines capability, business processes, organization models, and data models into a single unified view of the business and its development priorities. All of the industry models described in the upcoming sections rely on the participation of one or more service-enabled organizations and, correspondingly, the existence of one or more enterprise service models.

As a conceptual simulation of how an enterprise operates, this type of model can be applied to any organization. Developing such a model for an enterprise is valuable because any of the services contained therein can be delivered directly by IT assets using automated business processes or delivered as transactional units of business logic.

A unified model defines a physical inventory of services for implementation as IT assets and provides a common language that can be used by both business and IT professionals to better understand the other’s priorities, needs, and expectations. This alignment of IT and business encourages the development of IT solutions that can map accurately to and better support business processes, which in turn enhances business efficiency in the ability to capitalize on new opportunities and respond to new challenges. While next generation service-oriented enterprises already tend to use some service technologies to optimize business operations and achieve strategic business goals, new business opportunities can uniquely drive IT to embrace other, more diverse service technologies in an effort to leverage best-of-breed offerings.

Enterprises can have a large inventory of shared and deployed business services ranging from basic business transactions to automated, complex, or long-running business processes. With a well-defined enterprise service model of primary business activities, enterprises can prioritize solutions and leverage business models that provide the
foundation for reusable services. Solutions might include discovering new potential business partners, comparing vendor deals, and on-boarding new vendors. A well-defined service model offers a service consumer-service provider approach to conducting business between operating units within the enterprise and between the enterprise and its business partners.

Next generation SOA allows for the creation of a complete ecosystem that connects and supports both business and IT, providing full integration of business objectives, operations and processes, standards, rules, governance, and IT infrastructure and assets. Enterprises can base their information models on industry standards to facilitate the interoperability of custom services with business partners and other third parties.

The first step in developing an enterprise service model is to define high-level services that are then decomposed into progressively finer-grained services representing business activities, processes, and tasks. The service inventory contains all of the services from the service model that have been physically realized as IT assets. These services can be purchased commercially, developed internally, or provided by third parties.

The service approach readily identifies repeated tasks that are common to multiple different business units and business processes. Reusable services that perform these repeated tasks should undergo automation only once to avoid unnecessary duplication and simplify the overall complexity of the IT domain. Some utility-centric services, such as those that provide security, monitoring, and reporting-related processing, are highly reusable across all business domains. Since the physical services in the inventory mirror business processes, activities, and tasks, monitoring their execution can provide a real-time picture of how the enterprise is performing relative to its business targets, which is generally unachievable with commercial application packages.

**The Virtual Enterprise Model**

In the virtual enterprise model, companies join together in a loose federation to compete with major players in the same industry. The virtualization of a collective enterprise enables the member enterprises to collaborate on a specific business opportunity, and affords them the freedom of rapidly disbanding with relatively little impact on the individual enterprise. A virtual enterprise is a dynamic consortium of small and medium enterprises (SMEs) that have agreed to combine efforts to create a joint product or to bid for a major contract. Large corporations may also form consortia for large-scale projects. By leveraging cloud computing advances, virtual enterprises can become indistinguishable from physical enterprises as far as externally-facing customers and
users are concerned, since they typically have minimal physical presence and often little to no in-house infrastructure.

Members of the consortium may compete with each other outside the agreed scope of the virtual enterprise’s area of operations. This model allows small businesses to compete for major contracts or create products of higher complexity. Each consortium member contributes their existing skills and capabilities, and benefits from the ability to collectively achieve a result that none could accomplish individually. Opportunities, profits, and risks are shared across the consortium.

In this highly flexible model, virtual enterprises can form, expand, contract, and dissolve rapidly and inexpensively to meet market opportunities after establishing collective trust. Effective governance is required to coordinate the efforts of individual consortium members, and SOA technology can enable the integration of supply chains across the entire virtual enterprise. Service contracts and interfaces provide for clear communication between consortium members, while facilitating the addition and withdrawal of members to and from the virtual enterprise without requiring major changes to their infrastructure.

Many cross-enterprise business processes can be automated. The monitoring and reporting of automated processes and transactional service executions provides consortium members with accurate, realtime data on the state and operations of the virtual enterprise. This business model is mainly relevant for the manufacturing, distribution, retail, and service industries, as well as business opportunities provided by one-time events like the Super Bowl or Olympic Games.

A simple but promising variant of this approach would be an entrepreneurial organization whose business model is to act as a virtual holding company. A virtual holding company creates and manages virtual enterprises without being an active participant in the manufacturing of products or service offerings.

**The Capacity Trader Model**

In the capacity trader model, IT capacity is sold to customers as a commodity in a cloud computing environment. Parties with spare IT capacity sell to clients who require extra capacity. IT capacity traders buy and sell IT capacity to commercial users. Typically, these users operate in a different time zone and will use the purchased capacity outside of the capacity trader’s normal working hours. Capacity may also become available as the result of an oversized data center, a reduction in processing demand caused by business losses, or an overt business strategy.
Some organizations use the capacity trader model as a foundational business model to create IT capacity for sale to commercial users, while others offer capacity brokerage services and sign up multiple small capacity traders to create a high-capacity bundle that can be marketed at a premium. The capacity trader model is the 21st-century equivalent of the data center of the 1970s. Amazon.com, Inc. was the first company to sell its extra computing capacity, and many large computer companies have adopted this model to follow in its footsteps.

The Enhanced Wholesaler Model

According to the enhanced wholesaler model, the high speeds at which service-oriented automation enables wholesalers to receive contract bids from suppliers allow the wholesalers to respond more dynamically to demand, reduce, or even eliminate storage costs, and maximize profits. Traditional wholesalers buy products from multiple suppliers to sell to individual customers. The enhanced wholesaler model relies on one-stop shopping to meet customer needs for a range of products and reduce unit costs by purchasing large quantities from individual suppliers.

This model is in sharp contrast to the base wholesaler business model, where the wholesaler purchases goods or services from suppliers to sell to customers at a profit. The enhanced wholesaler can secure the best deals from many potential bidders, and, if necessary, combine their offerings to meet each customer’s requirements. It can further charge a commission for locating and introducing customers to suppliers.

Service technology improves on the enhanced wholesaler model by enabling the wholesaler to expand its network of suppliers and customers. The creation, enforcing, and monitoring of formal contracts helps the wholesaler maintain multiple business relationships, while the global nature of the Web has increased opportunities to trade over great distances. Warehousing costs may be eliminated in some cases by using drop shipping, where the manufacturer delivers the goods directly to the end user.

The Price Comparator Model

The price comparator model is where a commercial organization compares the bids of multiple competing suppliers to find the best possible deal for a potential customer. Price comparators perform the service of requesting and managing quotes from multiple competing companies for common commodities, such as insurance, hotel accommodation, or rental cars. Profits are based on commission per sale and a commission fee is typically charged to the successful vendor.
In many cases, price comparators give potential customers access to multiple quotes for common goods or services through a dedicated Web site. The visitor first enters their details to contact multiple potential vendors for different quotes before selecting a preferred option based on a combination of features and price and making the purchase. In such instances, the price comparison site takes a commission on the purchase.

Unlike enhanced wholesalers, price comparators never own the products they market, but simply act as intermediaries between the buyer and seller. Setup costs are low, but a substantial investment is required for advertising if the site targets private customers, as there is massive competition in some industries. Service technology enables price comparison sites to contact many potential providers in parallel and then rank and display their offerings in realtime. Financial details of the purchase transaction can be exchanged securely and promptly. This model adapts to any industry that markets goods and services to the general public.

The Content Provider Model

Content providers create information feeds containing textual, pictorial, and multimedia data for service consumers to access. Increasing availability of high-bandwidth communications has resulted in significant growth in the amount of electronically transmitted information, including items like sports feeds and movies. A content provider supplies information feeds to information aggregator organizations, such as telephone companies, the press, and commercial Web sites, that make such content available to customers for a direct fee or through funding from advertisers. The owner of an electronic asset can make that content available to a wide number of information integrators.

Piracy can be an issue, especially in the software and entertainment industries. Services provide a secure channel between the content provider and the content aggregator, while service monitoring can be implemented to automate the billing process and provide an audit trail. Multimedia, software, and e-books currently dominate the content provider model. Some content providers deal directly with retail customers rather than through content aggregators.

The Job Market Model

In the job market model, enterprises locate and hire contractors that possess the skills suitable for specific tasks. In recent years, the job market has become more dynamic and fluid. It was once common for new graduates to have a single career specialization
and to even be employed by the same company their entire working life, while graduates nowadays are generally expected to have multiple specializations, employers, and careers. Increasingly more professionals are working as short-term contractors rather than as long-term employees. The job market model is a specialized form of the employment agency that maintains a database of contractors with different skill sets and qualifications to meet the specific needs of employers.

The principal differences between the job market model’s contractor job center and an employment agency is that the positions filled are short-term rather than permanent, and that the contractors may be any combination of individuals and subcontracting companies. Using a contractor job center allows both the employer and the contractor to be part of a global marketplace without having to invest in infrastructure enterprises, which can reduce per-capita employment overheads and physical infrastructure costs. Business flexibility and agility can also be increased through the use of subcontractors rather than full-time employees. The number of contractors can be rapidly scaled up or down to dynamically meet business demands.

The increasing availability of high-bandwidth connectivity will enable many employees to work from rural or suburban locations, requiring a change in culture for many traditional businesses which will now need to employ individuals that they may never physically meet. Services provide a secure and precise means of communication between all parties. Service contracts provide information about the timing of requests and responses, and service interfaces allow software developers to remotely test and integrate systems code.

Service technology can automate the bidding process for each opportunity. The SOA infrastructure can use the agency to notify individuals of all of the opportunities for which they are qualified via a variety of channels, such as e-mail or instant messaging.

Most administrative processes can be automated to reduce setup and operating costs for the agency. While particularly appropriate for IT consultants, this model is likely the future of work for many professionals and administrative staff in many industries, who will either work from home or for small businesses. Contractor agents can be considered to be subcontractors in their own right. In addition to providing prospective employers with a list of candidates, they also employ the contractors themselves and are responsible for their performance. An alternative approach is to create a consultant market in which individuals or organizations bid against each other for specific contract opportunities. In this model, the contractor agency manages the bidding and vetoes or rates the bidder.
The Global Trader Model

The global trader model allows for an international marketing reach. While the Internet has certainly been successful at increasing the globalization of trade, some inhibitors still remain. The key issues involve trust, differences in commercial law and enforcement of those laws, and non-existent international standards.

Issues of trust exist whenever two organizations do business with one another. While Web standards help to provide secure communications, proof of identity, and an audit trail, they do not provide the ability to guarantee that each organization will fulfill contractual promises or that the quality of goods delivered or services performed will be satisfactory. This is especially problematic when the two organizations operate in different countries.

Differences in commercial laws and law enforcement are a problem for both enterprises and governments. Generally, enterprises cannot be confident that a foreign supplier's government will take appropriate action if that supplier breaches a business contract. Government bodies, especially those involved in customs and taxation, want to be sure that they are kept well-informed of all transfers of goods and chargeable services into and from their countries, which can be difficult to achieve if the transfers are performed electronically.

Few industries have standards that are truly international, and many countries handle business accounting and taxation quite differently. Addresses, for example, can take many different forms around the globe, while certain countries do not use a social security number or other unique identifier for each citizen. Two types of organizations known as industry watchdogs and guarantors have been established to address various inhibitors to global trade.

Industry Watchdogs

An industry watchdog is a trusted third party that has the authority to certify companies that have met a recognized set of performance standards. This helps to promote free trade by reducing the risk of dealing with unknown suppliers. On the other hand, certification is not a guarantee of quality, and certified companies that commit a breach of trust may lose their status. In some countries, the capacity of watchdogs is limited to the regulation of companies within borders, while most regulators in the United States can only operate within an individual state.
Guarantors

Guarantors use the insurance model to provide more active protection of individual business transactions, ensuring that each of the parties involved in a specific single contract fulfills its obligations. A guarantor acts as an intermediary for commercial business transactions and reimburses the customer in the event that the supplier fails to meet contractual obligations. A common method of reimbursement is for the guarantor to act as an escrow account, taking payment from the customer but not paying the supplier until the goods or services have been provided.

The guarantor can profit from this approach by earning interest on the fees held in escrow. However, reimbursing customers for high-value business transactions gone awry without a relatively high volume of business can present a risk, and excessive reimbursement can damage the guarantor’s profitability. A relationship of trust with both clients and suppliers first needs to be established in order for the escrow model to succeed. A standalone retail transaction insurer could also use this business model.
This page intentionally left blank
A

ACM (adaptive case management), 71
adaptive case management (ACM), 71
agent-driven architecture, 73-74
agility, 20
Agnostic Capability, 39, 41, 141
Agnostic Context, 30-31, 39, 41, 142
agnostic context, 30-31
agnostic logic, 27
agnostic service capability, 32-34
Annotated SOA Manifesto, 49-62
API management, 68
“as-a-service” usage model, 166

B

balanced scope pillar, 22, 154-156
BI (business intelligence), 75-76
Big Data, 77-78
BPEL (Business Process Execution Language), 70
BPM (business process management), 70
BPMN (Business Process Model and Notation), 70-71
BRE (business rule engine), 72
Business Aligned maturity level, 23, 158
Business Driven maturity level, 23, 159
business intelligence (BI), 75-76
reporting, 77
Business Process Execution Language (BPEL), 70
business process management (BPM), 70
Business Process Model and Notation (BPMN), 70, 71
business rule engine (BRE), 72
business-driven characteristic, 13, 132-134

C

Capability Composition, 39-41, 143
Capability Recomposition, 39-43, 144
capacity trader model, 82-83
case study, Rent Your Legacy Car (RYLC), 90-113
background, 90-91
conclusion, 110-113
CEP (complex event processing), 74-75
chorded circle symbol, 8
cloud computing, 67
goals and benefits, 164-168
risks and challenges, 168-172
complex event processing (CEP), 74-75
components, 66
composition. See service composition
composition controller, 36
composition-centric characteristic, 14,
138-139
c ons cerns, separation of, 28-29
content provider model, 84
cycle of change, 16-17

decomposition. See functional
decomposition
decoupling, 74
design patterns, 17, 140
Agnostic Capability, 39, 41, 141
Agnostic Context, 30-31, 39, 41, 142
Capability Composition, 39-41, 143
Capability Recomposition, 39-43,
144
Domain Inventory, 145, 155
Enterprise Inventory, 146
Functional Decomposition, 39, 41,
147
Non-Agnostic Context, 34-36, 39,
41, 148
in service composition, 41
Service Encapsulation, 30, 39, 41,
149
www.soapatterns.org, 5
design principles
list of, 12-13
Service Abstraction, 12, 37-38, 122
Service Autonomy, 13, 37-38, 125
Service Composability, 13, 26, 37-38,
130-131
in service compositions, 37-38
Service Discoverability, 13, 37-38,
128-129
Service Loose Coupling, 12, 37-38,
121
Service Reusability, 12, 26, 37-38,
42, 123-124
Service Statelessness, 13, 37-38,
126-127
Standardized Service Contract, 12,
37-38, 119-120
discipline pillar, 22, 153
distributed computing, 29
Domain Inventory, 145, 155
domain service inventory, 44-46
EDA (event-driven architecture), 74-75
education pillar, 22, 153
EII (enterprise information integration),
76-77
encapsulation, 30, 39, 41, 149
enhanced wholesaler model, 83
t ollowrise information integration (EII),
76-77
Enterprise Inventory, 146
enterprise service model, 80-81
t enterprise-centric characteristic, 14,
137-138
entity abstraction, 33-34
Entity Service model, 28
EPC (Event-Driven Process Chain), 70
ETL (extract-transform-load), 76-77
event ontology, 74
t ollowrise driven architecture (EDA), 74-75
t ollowrise driven process chain (EPC), 70
extract-transform-load (ETL), 76-77
Index

F
financial benefit of cloud computing, 164-166
flexibility, 20
functional decomposition, 28-29
  agnostic contexts, 30-31
  agnostic service capabilities, 32-34
  non-agnostic contexts, 34-36
  service encapsulation, 30
Functional Decomposition, 39, 41, 147

G
global trader model, 86-87
goals of service-orientation, 18-20
governance, 168-170
governance system, 23-24, 160-162
guarantors, 87

H-I
history of service-orientation, 9-12
industry models
  capacity trader, 82-83
  content provider, 84
  enhanced wholesaler, 83
  enterprise service, 80-81
  global trader, 86-87
  job market, 84-85
  price comparator, 83-84
  virtual enterprise, 81-82
industry watchdogs, 86
inventory,
  domain service, 44-46
  service, 16, 42

J-K-L
job market model, 84-85
JSON (JavaScript Object Notation), 65
legal issues of cloud computing, 171-172
loose coupling, 74

M
MDA (model-driven architecture), 68
MDM (master data management), 71
MDSD (Model-Driven Software Design), 68-69
metrics, 24, 162
mobile computing, 72-73
model-driven architecture (MDA), 68
Model-Driven Software Design (MDSD), 68-69
models. See industry models

N
Non-Agnostic Context, 34-36, 39, 41, 148
non-agnostic contexts, 34-36
non-agnostic logic, 27

O
objectives, 161
object-orientation in history of service-orientation, 9-11
OData (Open Data Protocol), 65
Ontology Web Language (OWL), 69
OOA (object-oriented analysis), 10-11
OOAD (object-oriented analysis and design), 10
OOD (object-oriented design), 10-11
Open Data Protocol (OData), 65
orchestration, 70-71
organizational maturity levels, 22-23, 156-157
  Business Aligned, 23, 158
  Business Driven, 23, 159
  Service Aggressive, 22, 159
  Service Aware, 22, 157-158
  Service Capable, 23, 158
  Service Ineffecual, 22, 159
  Service Neutral, 22, 157
OWL (Ontology Web Language), 69

P-Q
people (in relation to governance), 24, 162
pillars of service-orientation, 20-22, 152
policy, 161
precepts, 24, 160-161
Prentice Hall Service Technology Series from Thomas Erl, 2, 4
price comparator model, 83-84
process abstraction, 35-36
processes, 24, 161-162

R
RDF (Resource Description Framework), 69
realtime analytics, 77
recomposition, 38
reliability of cloud computing, 167-168
Rent Your Legacy Car (RYLC) case study. See case study, Rent Your Legacy Car (RYLC)
Resource Description Framework (RDF), 69
REST services, 65
roles (in relation to governance), 24, 162
RYLC (Rent Your Legacy Car) case study. See case study, Rent Your Legacy Car (RYLC)

S
scalability of cloud computing, 166-167
scope, 22, 154-156
security of cloud computing, 168-169
semantic Web technologies, 69
separation of concerns, 28-29
Service Abstraction design principle, 12, 37-38, 122
Service Aggressive maturity level, 22, 159
service architecture, 15
Service Autonomy design principle, 13, 37-38, 125
Service Aware maturity level, 22, 157-158
service candidates, 28
service capability candidates, 28
  composition and recomposition, 39-43
Service Capable maturity level, 23, 158
Service Composability design principle, 13, 26, 37-38, 130-131
service composition
  defined, 16
  service-orientation and, 36-38
service composition architecture, 15
Service Discoverability design principle, 13, 37-38, 128-129
Service Encapsulation, 30, 39, 41, 149
Service Ineffecual maturity level, 22, 159
service inventory, 16, 42
  architecture, 15
pillars of, 20-22, 152
service composition and, 36-38
service-oriented architecture (SOA). See
SOA (service-oriented architecture)

service-oriented enterprise architecture, 15
services
described, 8-9
Web-based, 64-65

SGPO (SOA Governance Program Office), 24
silo approach, service technology versus, 64

SKOS (Simple Knowledge Organization System), 69
SOA (service-oriented architecture)
characteristics, 13-14, 132
  business-driven, 13, 132-134
  composition-centric, 14, 138-139
  enterprise-centric, 14, 137-138
  vendor-independent, 14, 134-137
design patterns. See design patterns
governance system, 23-24, 160-162
in history of service-orientation, 11
types, 15-17

SOA Governance Program Office (SGPO), 24
SOA Manifesto, 48-49
  annotated version, 49-62

SOAP-based Web service, 65
social network technologies, 72
Standardized Service Contract design principle, 12, 119-120
standards, 161
sustainability, 20

T-U-V
task service, 27, 35-36
teamwork pillar, 22, 153
utility abstraction, 32-33
utility service, 28

vendor-independent characteristic, 14, 134-137
virtual enterprise model, 81-82
virtualization, 66

W
Web Services Description Language (WSDL), 65

Web sites
  errata, 4
  resources, 4
  updates, 4
  www.bigdatascienceschool.com, 6
  www.cloudpatterns.org, 5
  www.cloudschool.com, 5
  www.serviceorientation.com, 5, 118
  www.servicetechbooks.com, 4, 6
  www.servicetechmag.com, 5
  www.servicetechspecs.com, 4
  www.soa-manifesto.com, 49
  www.soapatterns.org, 5, 17, 41, 140
  www.soaprininciples.com, 118
  www.soaschool.com, 5
  www.whatiscloud.com, 5
  www.whatisrest.com, 5

Web-based service, 64-65
WS-* extensions, 65
WSDL (Web Services Description Language), 65
XML Schema, 65