

# Chapter V

## Service Discovery

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### ABSTRACT

*The chapter “Ubiquitous Services and Business Processes” discussed the benefits for real time enterprises of service oriented architectures (SOA) in terms of reusability and flexibility. Web services are one incarnation of SOA. This chapter gives a brief introduction to SOA. It discusses the attributes that define SOA, the roles of the participants in a service oriented environment. The essence of SOA is that clients use services offered by a service provider to get a task done. For the moment we simplify service to “a software component with network connection”. Services are offered with a description at well-known “places” (also called registries, repositories), where clients choose services according to their needs. The chapter discusses several approaches to describe services and to look for them. Moreover, some well-known systems, and also current research, are discussed.*

### INTRODUCTION

We live in a service society and every day we are able to make use of many services because of the specialized training people have in different service areas. We need our damaged cars repaired and our hair cut, so we use the yellow pages to find feasible service providers and eventually negotiate with some of them to make a final decision of whom to use. This kind of specialized business has many advantages for consumers; the service providers are specialists, therefore they do the job faster, better, and cheaper than we could ourselves.

And if not satisfied, another service provider will be chosen next time.

Not surprisingly, this pattern to handle portions of work can also be found in distributed computer systems, namely “service oriented Architectures” (SOA) or “service oriented computing” (SOC). Applications are built of services, where each service fulfills a task for the application. Services are either implemented in software or act as proxies (“bridge”) to hardware, for example printers or light switches. In contrast to software components, services run on different computers and communicate over networks with their clients.

## SERVICE ORIENTED ARCHITECTURES

Although the general idea of service-oriented architectures is well understood, there are two competing views on SOA. Firstly, there are definitions that emphasize the “sum of operations provided by an object” (e.g., like in the “Open Distributed Processing” standard). A concrete technology then implements this model as shown in Figure 1. Secondly, there are definitions that already refer to the implementations or instances of a concrete technology as service (e.g., “Web Service Technology”).

Depending on the model and the implementation of SOA, the terminology may vary, but there are common elements to all of them:

- Service is the sum of operations or actions provided by a service provider to a service client.
- (Service) Provider provides one or more services.
- (Service) Client uses services.
- Service Implementation is the technical realization (implementation) of the service.
- Client Implementation is the technical realization (implementation) of the client.
- Computational Interface is a mapping of the service to a concrete technology or

programming language to use the service implementation.

- Network is used for communication between provider and client.

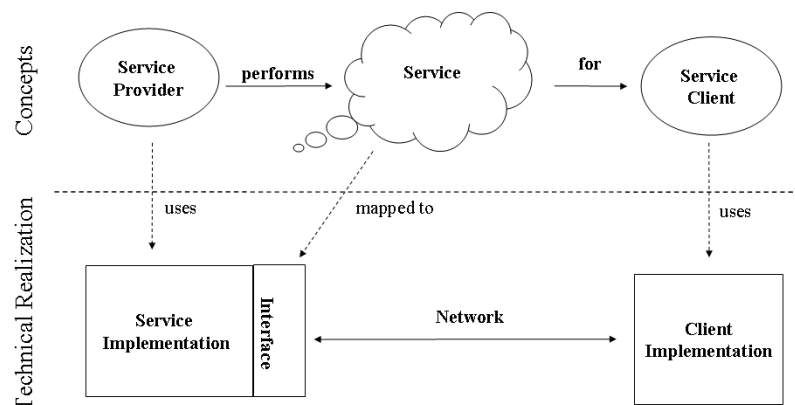
Another rarely used definition of “service” emerged with dynamic web pages for human users such as shops, route planning applications, search engines. In this case, the action offered on these Websites is referred to as a service, for example “selling a book” and “searching for a term”. This case is out of the scope of this chapter. In our definition clients of services are (normally) other services or applications, but not human users. Of course, the Web pages mentioned can also offer a computational interface. This would also make them services according to our definition. Well-known examples are google.com or amazon.com. They can be accessed through Web pages by human users, but also through SOAP by other Web services.

## Finding Services

Service client and service provider may not know each other at runtime and therefore a mechanism for them to find each other has to be provided. This is another part of defining SOAs.

Figure 2 gives an overview of the roles in SOA. The service provider announces (registers) its services at a service registry (repository). Depend-

Figure 1. Service model



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