# Chapter 3.18
# Convergence in Mobile Internet with Service Oriented Architecture and Its Value to Business

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## ABSTRACT

The word "convergence" refers to the combination of fixed and mobile communication, a situation where a private or business user can take advantage of being constantly connected and be able to retrieve applications and data by swapping device, with the limitations that a mobile device may have such as smaller screen and keyboard, reduced storage capability, and limited power provided by batteries. Convergence can also include imagining how mobile technology can be a component of everyday items and how data, applications, and services can be delivered via the network infrastructure. This chapter aims to cover RFID technology, Bar code and Service-Oriented Architecture (SOA): the first two technologies are dealt with in parallel to provide an overall view of advantages and disadvantages, while SOA will be part of a distinct discussion and analysis. Eventually, some practical examples of these discussed technologies are provided.

DOI: 10.4018/978-1-60566-156-8.ch054

## INTRODUCTION

RFID and Bar code are two emerging mobile technologies able to provide competitive strategic advantage to business when properly deployed and implemented. As extension of current fixed network infrastructure, the coordination with existing business processes, department and organizational structure are an essential part of rewarding implementation. The development of

SOA environment can further enhance the capability and possible outcome of RFID and Bar code. The chapter outlines advantages and disadvantages for both of them, providing examples of how they co-exist and how they can create value.

## RFID and Bar Code

Radio frequency identification (RFID) is one of the most interesting technologies today: its use impacts a large number of protagonists in private and business environment but it also raises simple and dramatic issues in legal, social and political affairs. RFID have histories back to 1930 and 1940, when the British Army, during WW 2 pioneered RFID to identify their own aircraft returning home from bombing Europe. Early radar systems could spot an incoming airplane but not its type (Lahiri, 2006; Garfinkel, Rosenberg 2006; Ascential 2005)

RFID uses radio waves to detect physical items (both living and inanimate) and therefore the range of identifiable object includes everything and everywhere: RFID is an example of automatic identification technology through which an item is automatically detected and classified. Bar code, biometric, voice identification and optical character recognition systems are other example of automatic identification.

The RFID environment consists of a set of mandatory and optional components: Mandatory parts are: tag, reader, antenna controller. Sensor, actuator, host and software system and communication infrastructure are the optional parts. The table below describes the types and usage of RFID in different situations, according to their technical features

The advantages of RFID can be classified as follows (Lahiri, 2006; Garfinkel, Rosenberg 2006; Ascential 2005):

- RFID tag can be read without any physical contact between the tag and the reader
- The data of RFID can be rewritten several times with no diminishing quality or integrity
- A line of sight is not required for an RFID reader to read a tag
- The range can vary from few centimetres to some metres
- Storage capability of a tag is unlimited
- A reader can read different tags within its reach for a limited time
- A tag can be structured to perform unlimited duties
- The data quality is 100% guaranteed

RFID has its limitation that can be summarized as it follows

- RFID do not work well or not work at all with RF-opaque items or RF-absorbent items
- Surrounding conditions may affect performance
- There is a limit for how many tags can be read within a time slot
- Hardware set up may limit performance
- The technology is still immature

*Figure 1. Type and usage of RFID*

| Band | Frequency | Wavelength | Usage |
|---|---|---|---|
| Low frequency | 125 – 134.s KHz | 2.400 meters | Animal tags and keyless entry |
| High frequency | 13,56 MHz | 22 meters | As above |
| UHF (ultra high) | 865.5-867 Europe<br>913 US<br>950-956 Japan | 32.8 centimetres | Smart cards, logistic |
| ISM (industrial scientific and medical) | 2.4 GHz | 12.5 centimetres | items |