Chapter 7.6

Envisioning the Paradigm of Service Oriented Hydrology Intelligence (SOHI)

Pethuru Raj Chelliah
Robert Bosch India, India

ABSTRACT

Hydrology is an increasingly data-intensive discipline and the key contribution of existing and emerging information technologies for the hydrology ecosystem is to smartly transform the water-specific data to information and to knowledge that can be easily picked up and used by various stakeholders and automated decision engines in order to forecast and forewarn the things to unfold. Attaining actionable and realistic insights in real-time dynamically out of both flowing as well as persisting data mountain is the primary goal for the aquatic industry. There are several promising technologies, processes, and products for facilitating this grand yet challenging objective. Business intelligence (BI) is the mainstream IT discipline representing a staggering variety of data transformation and synchronization, information extraction and knowledge engineering techniques. Another paradigm shift is the overwhelming adoption of service oriented architecture (SOA), which is a simplifying mechanism for effectively designing complex and mission-critical enterprise systems. Incidentally there is a cool convergence between the BI and SOA concepts. This is the stimulating foundation for the influential emergence of service oriented business intelligence (SOBI) paradigm, which is aptly recognized as the next-generation BI method. These improvisations deriving out of technological convergence and cluster calmly pervade to the ever-shining water industry too. That is, the bubbling synergy between service orientation and aquatic intelligence empowers the aquatic ecosystem significantly in extracting actionable insights from distributed and diverse data sources in real time through a host of robust and resilient infrastructures and practices. The realisable inputs and information being drawn from water-related data heap contribute enormously in achieving more with less and to guarantee enhanced safety and security for total human society. Especially as the green movement is taking shape across the globe, there is a definite push from different quarters on water and ecology professionals to contribute their mite immensely and immediately in permanently arresting the ecological degradation. In this

chapter, we have set the context by incorporating some case studies that detail how SOA has been a tangible enabler of hydroinformatics. Further down, we have proceeded by explaining how SOA-sponsored integration concepts contribute towards integrating different data for creating unified and synchronized views and to put the solid and stimulating base for quickly deriving incisive and decisive insights in the form of hidden patterns, predictions, trends, associations, tips, etc. from the integrated and composite data. This enables real-time planning of appropriate countermeasures, tactics as well as strategies to put the derived in faster activation and actuation modes. Finally the idea is to close this chapter with an overview of how SOA celebrates in establishing adaptive, on-demand and versatile SOHI platforms. SOA is insisted as the chief technique for developing and deploying agile, adaptive, and on-demand hydrology intelligence platforms as a collection of interoperable, reusable, composable, and granular hydrology and technical services. The final section illustrates the reference architecture for the proposed SOHI platform.

INTRODUCTION

Once it was IT-driven businesses. Business objectives and operations were supported and supplied by the available technologies of yore. Today it is just the reverse. In other words, it is getting into the business-driven IT. We have an array of business-driven technologies emerging and establishing steadily. Service oriented architecture (SOA) is the most prominent business technology today. There is a healthy and sustainable synchronization between business demands and IT innovations. It is preferred and perfect if business scenes and sentiments are in sync with the technological inventions and improvisations happening around us. Business-centric technologies are more appropriate for solving tricky and tough business problems. SOA is perfectly destined to prescribe

simple yet sophisticated solutions for many of the ills affecting enterprise IT severely. Primarily there are strategic needs for modernization, consolidation, integration and composition of enterprise IT resources across industries today. Another prime requirement is timely extraction of insights from the business data getting created, captured and stocked in order to act on them intelligently. Hydrology, being data-centric field, is not an exception for this overwhelming view across the spectrum.

The mainstream trend occupying worldwide business houses especially water industries is the smooth and speedy translation of disintegrated and distributed data into useful and usable information. Every data-centric domain throws tactic as well as strategic insights that can be procured, persisted, prioritised, and processed for considering game-changing decisions that can bring unprecedented impacts and implications on productivity, operational, and delivery-related aspects. For example, we have data-intensive CRM systems for rolling out customer intelligence (useful information about customers' profile, priority, preference, peculiarity, etc.), security systems for gaining veritable security intelligence, transactional system for producing business intelligence, supply chain applications delivering supply chain intelligence, operational systems for supplying operational and performance intelligence, and even enterprise information systems (EISs) and packages guaranteeing for enterprise-scale intelligence. In the similar way, all kinds of hydrology IT systems generate hydrological intelligence that has to be cleanly and compactly captured and capitalized in order to arrive at better solutions for all sorts of problems encircling aquatic environments. There are proven methodologies for smoothly extracting relevant intelligence from voluminous and noise data and these can be quietly replicated in the hot domain of hydroinformatics.

Intelligence-generating and inferring systems comprise a number of distinct yet cooperative modules such as analytics software, predictive

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