SYNOPSIS

The goal of the dissertation is to suggest the following aspects: 1) mapping process specific web service elements to semantic concepts, 2) service composition using semantic concepts, 3) Illustrate the Web Service application in Scientific Research. The current research has been focusing on using ontology models for semantically annotating Web services. This research will expand the ontology model approach and directly leverage semantics in business process models. Model Driven Development (MDD) approach will be applied in the research to enable model mapping/transformation/merging between business process models, Web services models and ontology models.

The backbone of the dissertation is to build new business process, services and values through compositing existing services quickly and reliably. This requires not only syntax description of the web services but also semantic description being integrated into the web services and used effectively in an automated. The approach aims at providing maximum reusability of available software components; flexible architecture with high scalability and effective collaboration with existing components. In addition a framework has been suggested to incorporate web standards for existing applications. Application of Web Services in Scientific Computation is illustrated with special reference to Nanotechnology.

The thesis contains Nine chapters. In Chapter ! we have given an elaborate introduction. In Chapter 2, we present an in-depth study of Services. We illustrate the role of services in enabling interactions on the Semantic Web. In Chapter 3, we present and illustrate the role of Web services in enabling characteristics, architecture, service description, composite services on the Semantic Web. In Chapter 4, we illustrate the role of Web services in enabling interactions on the Semantic Web. We present implementation and description details of the languages which supports semantic web. In Chapter 5 we present an in-depth study of Web Service. We illustrate the role of Web services in enabling automatic service composition on the Semantic Web. We present framework implementation and description details of the semantic web. In Chapter 6 we discuss about the various Web –based softwares

which are free and priced. We describe the implementation and description details of the semantic web which has been used in nanotechnology. In Chapter 7 we present our computation carried out in Nanotechnology using the Web Services and Web-based Softwares. In Chapter 8 we describe the major techniques, standards, and platforms for Web service compositions that are most closely related to our research. Chapter 9 contains the concluding remarks and s directions for future research.