# **TOWARDS DYNAMIC COMPOSITION OF ADAPTIVE SERVICES**

Finn Arve Aagesen, Bjarne E. Helvik, Chutiporn Anutariya Department of Telematics, Norwegian University of Science and Technology 7491 Trondheim, Norway

{Finn.Arve.Aagesen, Bjarne.E.Helvik, Chutiporn.Anutariya}@item.ntnu.no http://www.item.ntnu.no/~plugandplay/



#### MOTIVATION

#### How to handle:

An increasing heterogeneity and complexity in today's networking, wide area distributed computing and service provision --- not only due to technology, but also due to the large number and widely differing participants in the area.

Diverse resources and services in terms of dependability, availability, performance, capabilities, security, costs and QoS.





- A **<u>Research Project</u>** which aims at development of a technology that allows independent participants in a global-scale network to provide resources and services as well as to dynamically compose services from available network resources and services.
- It integrates well-established technologies of
- The Semantic Web --- for precise and unambiguous service descriptions),
- Grid computing --- for distributed resource sharing in a dynamic, heterogeneous environment, and
- Plug-and-Play architecture --- for adaptive service (re)configuration, deployment and execution.

# **MULTIPLE ROLES OF PARTICIPANTS AND** THE MAJOR TYPES OF CAPABILITIES



### **ADAPTIVE SERVICE SCENARIO AND LIFECYCLE**





#### WSDL SERVICE INTERFACE DESCRIPTION

(Defining service invocation mechanism)

## **DYNAMIC SERVICE INSTANTIATION AND CONFIGURATION IN PAP SYSTEMS**



- 5. From the obtained list, Participant R selects a service with the best offering assuming that the service provided by Participant S is selected. Negotiation process may occur to reach an acceptable agreement.
- 6. Participants R and S establish a service contract, and the service is invoked.
- 7. Relying on the contract and the service definition, Participant S instantiates the service by assembling a set of sub-services. This is an iterative of the above processes. That is, it again involves finding of appropriate service providers, negotiate, set up contracts and invoke the sub-services. The definition of how these sub-services interoperate and collaborate is defined by the service definition.
- 8. Participant S monitors the executing service, and performs certain appropriate adaptation when needed. Upon the completion of the service, an output is sent back to the consumer in form of either a simple message informing the service completion or some complex contents representing the results of service execution. The executing service instance is then terminated and the allocated resources are freed.

