The University Of Queensland

Design Document

Distributed Computing Assignment – 1

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Contents

Table of Figures

1. Design

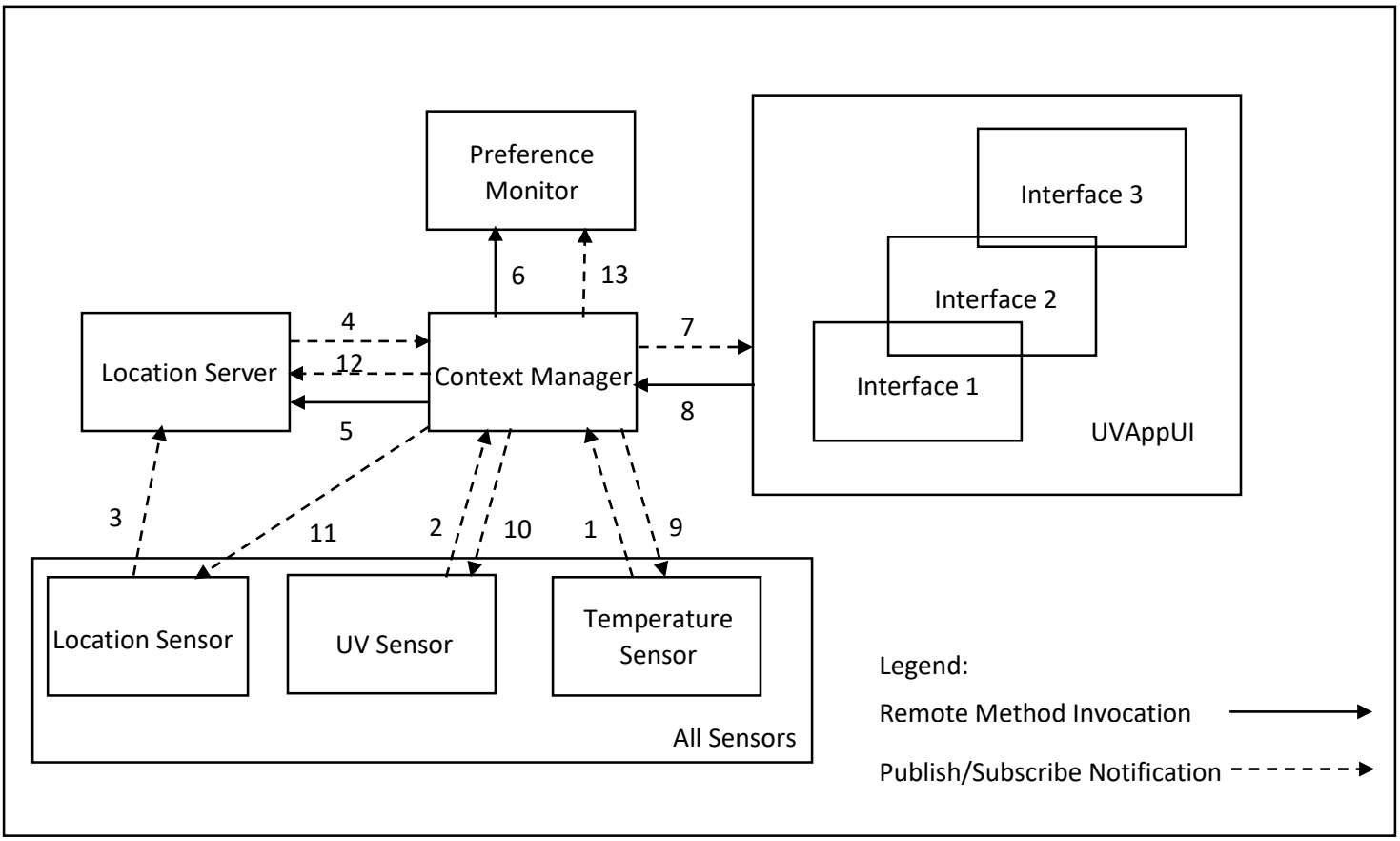

Figure 1. Design

The design above shows the respective communication paradigm chosen to build the UVSmart application. The regular arrows show the Remote Method Invocation method and the dashed arrows show the Publish/Subscribe paradigm used.

2. Communication

The below table shows the communication paradigms used to implement the UVSmart application along with a brief description.

Arrow Number	Sending Component	Receiving Component	Communication Paradigm	Brief Description
1	Temperature Sensor (AllSensors)	Context Manager	Publish/Subscribe	Temperature readings are published for respective users which will be subscribed by Context Manager.
2	UV Sensor(AllSensors)	Context Manager	Publish/Subscribe	UV Index reading are published for respective users which will be subscribed by Context Manager.
3	Location Sensor(AllSensors)	Location Server	Publish/Subscribe	Location readings are published for respective users which will be subscribed by Location Server.
4	Location Server	Context Manager	Publish/Subscribe	Indoor/Outdoor status along with the location will be published for the location sensor readings. This will be subscribed by the Context Manager.
5	Context Manager	Location Server	RMI	Context Manager checks with the

				Location server if a location is Indoor or Outdoor before suggesting to the user.
6	Context Manager	Preference Monitor	RMI	When a user logs in, the Context Manager collects the Skin Type and the Temperature thresholds from the preference monitor. Also, the preferences of user are retrieved for the notification and suggestions for users.
7	Context Manager	User Interfaces	Publish/Subscribe	Temperature and UV threshold reached notifications are published by the context manager which will be subscribed by the User Interfaces.
8	User Interfaces	Context Manager	RMI	Query information is retrieved from the Context Manager.
9	Context Manager	Temperature Sensor(AllSensors)	Publish/Subscribe	Once all users exit, Context Manager publishes Shutdown notification to

				all other components.
10	Context Manager	UV Sensor(AllSensors)	Publish/Subscribe	Once all users exit, Context Manager publishes Shutdown notification to all other components.
11	Context Manager	Location Sensor(AllSensors)	Publish/Subscribe	Once all users exit, Context Manager publishes Shutdown notification to all other components.
12	Context Manager	Location Server	Publish/Subscribe	Once all users exit, Context Manager publishes Shutdown notification to all other components.
13	Context Manager	Preference Monitor	Publish/Subscribe	Once all users exit, Context Manager publishes Shutdown notification to all other components.

Figure 2. Communication paradigm summary table

3. Startup and Shutdown

The order in which the components are started is important as some components are dependent on data by other components.

Startup Order:

a. Preference Monitor is started with appropriate preference file as input.
b. AllSensors is started for required users with the User Name as input.
c. Location server is started with location configuration file as input.
d. Context Manager is started with city configuration file as input.
e. User interface (UVAppUI) is then started and login and further operations are carried out.

Shutdown:

Once all the logged in users exit, context manager sends a notification to all other components to unsubscribe the topics and shutdown.