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Retrieval functions and invocation of e-Service in multi-channel information systems

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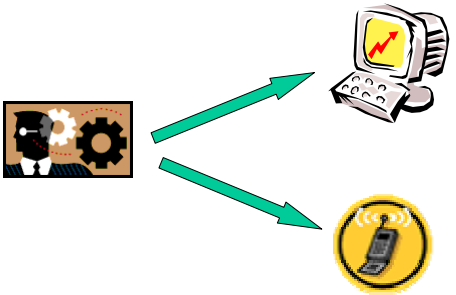
MULTI-CHANNEL information systems

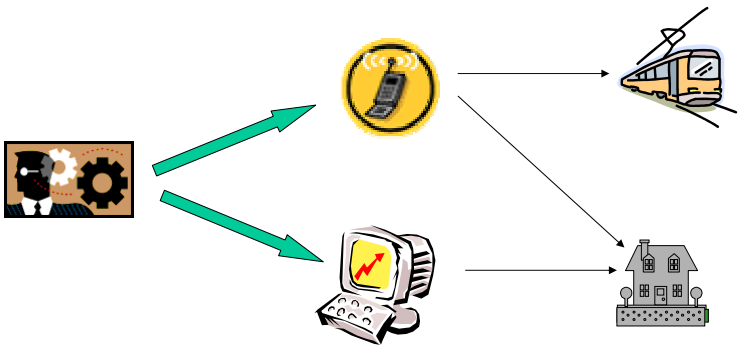
- Today the services are usually provided by a single-channel
- We want to provide services through different channels



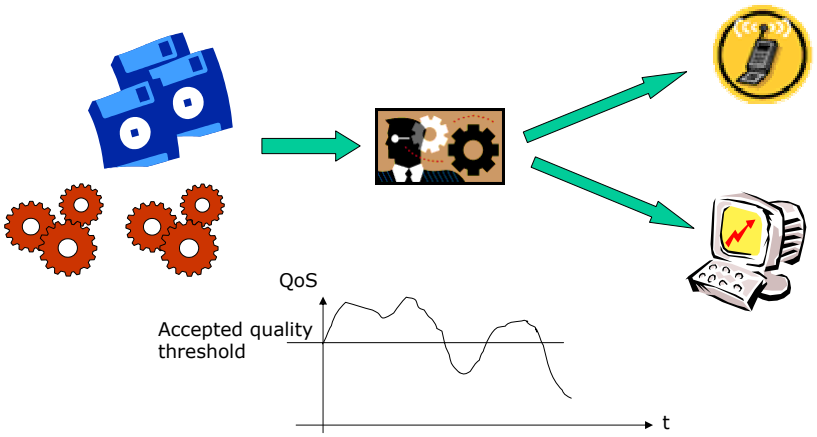
Multi-channel ADAPTIVE information systems

- The client could change the channel, according to available channels, during service exploitation
- The system could adapt the service provisioning by changing the providing channel, according to the quality of service (QoS) of the available channel

Multi-channel ADAPTIVE information systems



Multi-channel ADAPTIVE information systems



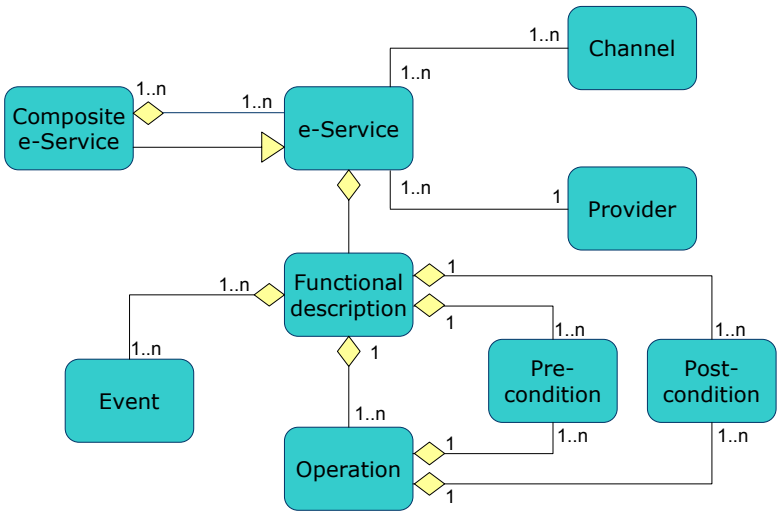
Goals

- Service composition requires service discovery
- Currently proposals are not enough (UDDI, WSDL, WSxx)
- The goal is to provide a set of functions which allows the service discovery which takes into account:
  - The functional aspects
  - The non-functional (quality)

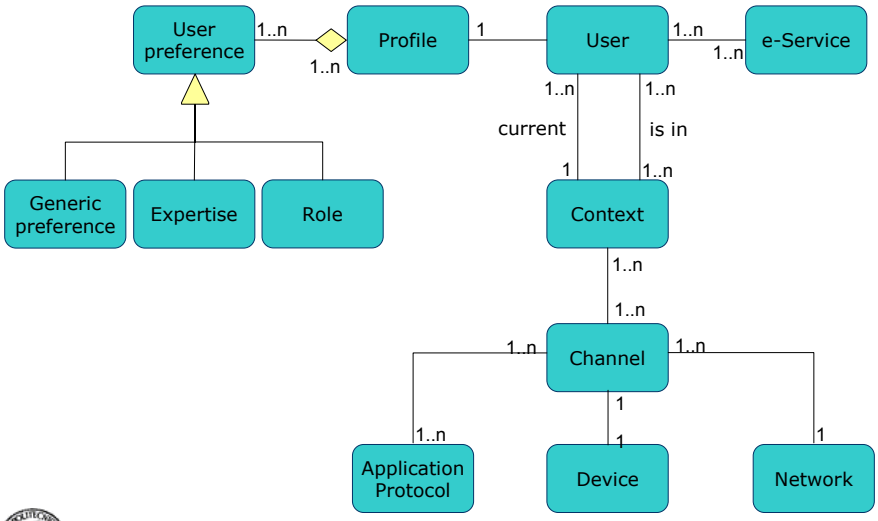
What do we need?

- e-Service Model that considers:
  - functional aspects
  - non functional aspects
- …taking into account the multi-channel environment
- …through two different standpoints:
  - user perspective
  - provider perspective

e-Service provisioning



e-Service request



Non functional aspects

- Application dependent
- Different perceived by the user and provider
- More difficult to define due to the network specifications

System Model

- Objects:
  - Services
  - Network
  - Devices
- Actors:
  - Service providers
  - Network providers
  - Device providers
- Communities and specifications:
  - a group of actors which aims at proposing a specification for a group of objects with some relevant common characteristics

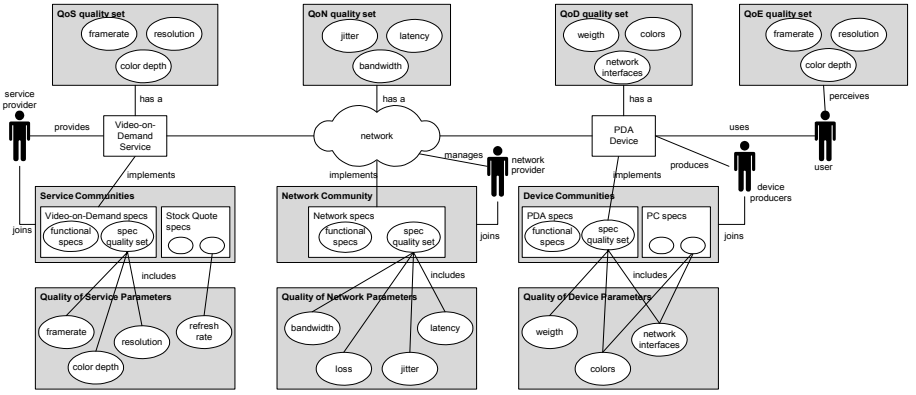
Quality Parameter

- qp = <name, admissible values> where:
  - name identifies the parameter
  - admissible values is an ordered set of typed values in which the parameter is admitted to range.
- Examples of quality parameter could be
  - <bandwidth, [1Kps..512Kps]>
  - <encryption, [40bit; 64bit; 128bit]>
  - <resolution,[320x200;800x600; 1024x768;1240x748]>
  - <latency, [10ms...500ms]>
- We are interested on the *best* and *worst* values of a quality parameter

Quality rules

- Given two quality sets QS_1,QS_2 a quality rule for QS_1 on QS_2 is a function $qr_{12}(QS_1,QS_2) = QS_3$ such that:
  - QS_3 is a quality set
  - QS_3 is contained in QS_1
- Quality rules are used to relate the network with respect to the device and service
  - $qr_{s,ci}$ ($S.QS_{QoS}$, $qr_{n,d}(S.QS_{QoN}, S.QD_{QoD})$)

e-Service Quality model



Example

- VoDspec.QSQoS = {
  <framerate, [5fps..40fps]>,
  <colordepth, [2bit..24bit]>,
  <resolution, [320*200; 800*600; 1024*768]>}
- MyNetspec.QSQoN = {
  <bandwidth, [10Kbps...512Kbps]>,
  <loss, [0..0, 01]>,
  <latency, [5ms..500ms]>}
- Pcspec.QSQoD = {
  <colors, [2..24bit]>,
  <nwint, [802.11b; 802.3]>}
- SmartPhonespec.QSQoD = {
  <weight, [150gr..300gr]>,
  <colors, [2..16bit] >,
  <nwint, [GPRS;UMTS;GSM] >}

Example

*framerate*colordepth*resolution=K*bandwidth*

$$best(framerate) = \frac{best(bandwidth)}{worst(colordepth) * worst(resolution)}$$

$$worst(framerate) = \frac{worst(bandwidth)}{best(colordepth) * best(resolution)}$$