The invention provides a telecommunications transmission system adapted to operate as a platform for an agent-based electronic market and including a plurality of user terminals arranged for connection to the Internet, at least one service provider server, and a plurality of electronic shops. The platform is arranged to support agent-based market interactions between a plurality of agent types, and the system is adapted to synchronize a real-time session for a user on an agent-enabled web-site with communications between agents of said user and said web-site using duel session identification.
FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

<table>
<thead>
<tr>
<th>Code</th>
<th>Country</th>
<th>Code</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>Albania</td>
<td>ES</td>
<td>Spain</td>
</tr>
<tr>
<td>AM</td>
<td>Armenia</td>
<td>FI</td>
<td>Finland</td>
</tr>
<tr>
<td>AT</td>
<td>Austria</td>
<td>FR</td>
<td>France</td>
</tr>
<tr>
<td>AU</td>
<td>Australia</td>
<td>GA</td>
<td>Gabon</td>
</tr>
<tr>
<td>AZ</td>
<td>Azerbaijan</td>
<td>GB</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>BA</td>
<td>Bosnia and Herzegovina</td>
<td>GE</td>
<td>Georgia</td>
</tr>
<tr>
<td>BB</td>
<td>Barbados</td>
<td>GH</td>
<td>Ghana</td>
</tr>
<tr>
<td>BE</td>
<td>Belgium</td>
<td>GN</td>
<td>Guinea</td>
</tr>
<tr>
<td>BF</td>
<td>Burkina Faso</td>
<td>GR</td>
<td>Greece</td>
</tr>
<tr>
<td>BG</td>
<td>Bulgaria</td>
<td>HU</td>
<td>Hungary</td>
</tr>
<tr>
<td>BJ</td>
<td>Benin</td>
<td>IE</td>
<td>Ireland</td>
</tr>
<tr>
<td>BR</td>
<td>Brazil</td>
<td>IL</td>
<td>Israel</td>
</tr>
<tr>
<td>BY</td>
<td>Belarus</td>
<td>IS</td>
<td>Iceland</td>
</tr>
<tr>
<td>CA</td>
<td>Canada</td>
<td>IT</td>
<td>Italy</td>
</tr>
<tr>
<td>CF</td>
<td>Central African Republic</td>
<td>JP</td>
<td>Japan</td>
</tr>
<tr>
<td>CG</td>
<td>Congo</td>
<td>KE</td>
<td>Kenya</td>
</tr>
<tr>
<td>CH</td>
<td>Switzerland</td>
<td>KG</td>
<td>Kyrgyzstan</td>
</tr>
<tr>
<td>CI</td>
<td>Côte d'Ivoire</td>
<td>KP</td>
<td>Democratic People's</td>
</tr>
<tr>
<td>CM</td>
<td>Cameroon</td>
<td>KR</td>
<td>Republic of Korea</td>
</tr>
<tr>
<td>CN</td>
<td>China</td>
<td>KZ</td>
<td>Kazakhstan</td>
</tr>
<tr>
<td>CU</td>
<td>Cuba</td>
<td>LC</td>
<td>Saint Lucia</td>
</tr>
<tr>
<td>CZ</td>
<td>Czech Republic</td>
<td>LI</td>
<td>Liechtenstein</td>
</tr>
<tr>
<td>DE</td>
<td>Germany</td>
<td>LK</td>
<td>Sri Lanka</td>
</tr>
<tr>
<td>DK</td>
<td>Denmark</td>
<td>LR</td>
<td>Liberia</td>
</tr>
<tr>
<td>EE</td>
<td>Estonia</td>
<td>LS</td>
<td>Lesotho</td>
</tr>
<tr>
<td>ET</td>
<td>Ethiopia</td>
<td>LT</td>
<td>Lithuania</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
<td>LU</td>
<td>Luxembourg</td>
</tr>
<tr>
<td>LV</td>
<td>Latvia</td>
<td>MC</td>
<td>Monaco</td>
</tr>
<tr>
<td>MD</td>
<td>Republic of Moldova</td>
<td>MG</td>
<td>Madagascar</td>
</tr>
<tr>
<td>MK</td>
<td>The former Yugoslav</td>
<td>ML</td>
<td>Mali</td>
</tr>
<tr>
<td>MN</td>
<td>Mongolia</td>
<td>MR</td>
<td>Mauritania</td>
</tr>
<tr>
<td>MW</td>
<td>Malawi</td>
<td>MX</td>
<td>Mexico</td>
</tr>
<tr>
<td>NE</td>
<td>Niger</td>
<td>NL</td>
<td>Netherlands</td>
</tr>
<tr>
<td>NO</td>
<td>Norway</td>
<td>NZ</td>
<td>New Zealand</td>
</tr>
<tr>
<td>PL</td>
<td>Poland</td>
<td>PT</td>
<td>Portugal</td>
</tr>
<tr>
<td>RO</td>
<td>Romania</td>
<td>RU</td>
<td>Russian Federation</td>
</tr>
<tr>
<td>SD</td>
<td>Sudan</td>
<td>SE</td>
<td>Sweden</td>
</tr>
<tr>
<td>SG</td>
<td>Singapore</td>
<td>SI</td>
<td>Slovenia</td>
</tr>
<tr>
<td>SK</td>
<td>Slovakia</td>
<td>SN</td>
<td>Senegal</td>
</tr>
<tr>
<td>SZ</td>
<td>Swaziland</td>
<td>TD</td>
<td>Chad</td>
</tr>
<tr>
<td>TG</td>
<td>Togo</td>
<td>TJ</td>
<td>Tajikistan</td>
</tr>
<tr>
<td>TM</td>
<td>Turkmenistan</td>
<td>TR</td>
<td>Turkey</td>
</tr>
<tr>
<td>TT</td>
<td>Trinidad and Tobago</td>
<td>UA</td>
<td>Ukraine</td>
</tr>
<tr>
<td>UG</td>
<td>Uganda</td>
<td>US</td>
<td>United States of America</td>
</tr>
<tr>
<td>UZ</td>
<td>Uzbekistan</td>
<td>VN</td>
<td>Viet Nam</td>
</tr>
<tr>
<td>YU</td>
<td>Yugoslavia</td>
<td>ZW</td>
<td>Zimbabwe</td>
</tr>
</tbody>
</table>
IMPROVEMENTS IN, OR RELATING TO, TELECOMMUNICATIONS TRANSMISSION SYSTEMS

The invention relates to a telecommunications transmission system adapted to provide a platform for electronic market place services, in particular agent orientated electronic market place services, such as, the Agent-based Market Place (AMP) services offered by Telia, and a method of operating said telecommunications transmission system.

The present invention is directed to, among other things, methods of operating the physical infrastructure associated with a telecommunications transmission platform used to support the provision of telecommunications based services. It is necessary to draw a clear distinction between the operation of an electronic market place, which may be modelled on real world market places, and the telecommunications infrastructure used to provide a platform on which the electronic market place operates. It must be recognized that the methods of commerce used on, for example the Internet, and methods of operating the technical elements of the Internet are distinct.

Internet use has dramatically increased. Many people now have access to the Internet, not only from their offices but also from their homes. Through the development and deployment of secure identification systems, electronic payment systems etc., electronic commerce, e-commerce, on the Internet is becoming an acceptable way of conducting business safely and securely.

It is considered by many market research organizations that electronic commerce will be one of the fastest growing areas on the Internet because it not only gives an Internet user a more convenient and time-saving shopping experience, but it also enables merchants, trading on the Internet, to save money through use of more cost-efficient operations including, inter alia, business process re-engineering at the enterprise level increasing competitiveness through lower prices and the ability to introduce one-to-one marketing techniques.
Many companies have realized the impact and possibilities that agent orientated services will have on e-commerce on the Internet, both today and in the future. For example, Netscape has announced that agent-based search engines will be introduced in coming releases, and Jango already uses a search engine for commercial information based on agent orientation. In addition, Firefly and NetPerception have introduced Recommendation Engines which are being used by Amazon.com and other commercially successful web sites. There are also companies, such as Kinetoscope, that offer tools for developing agent-oriented services for the Internet.

When a customer browses a web-based store, both the customer and the merchant are interested in presenting information that is relevant for the customer. The problem is that the merchant does not know who is visiting and which interests he/she has. Currently, solutions to this problem are based on trying to determine a customer’s interests, by observing the customer’s behaviour.

In order to avoid a merchant coming to the wrong conclusions, concerning a customer’s interests, it would be of advantage to the merchant if he/she could automatically be given instant knowledge of the customer’s interests by the customer himself. This can be achieved by sending information, concerning the customer’s interests, directly to the merchant using a separate protocol, because HTTP does not support transfer of interest information. However, a problem occurs with such an arrangement, when applications that communicate using both HTTP and an agent communication protocol, need to determine whether the communication via both channels is to/from the same source. This problem can occur, for example, when a personal assistant agent provides help to a user of the electronic commerce facility. In particular, in these circumstances, the personal assistant agent needs:

- a channel to allow the user to browse the offered commercial services and to interact manually; and

- a channel for machine-machine communication which is used for the automation of
commerce interaction and personalization for the rest of the HTTP session - in order to effect personalization, the user's personal assistant agent needs to send information concerning the user's interests, i.e. personal profile, to the accessed web-site which can then generate web-pages based on the user's personal profile.

With this arrangement, the merchant does not know which session of HTTP-accesses should be paired with a given session of agent messages. This is because the agent messages and the HTTP messages both have their own message identifiers, which are used to group messages together into sessions.

It is an object of the present invention to overcome this problem by providing a telecommunication system adapted to provide a platform for agent orientated electronic market place services that use the same session identifier for both the WWW-site and agent communications.

According to a first aspect of the present invention, there is provided, a telecommunications transmission system adapted to operate as a platform for an agent-based electronic market and including a plurality of user terminals arranged for connection to the Internet, at least one service provider server, and a plurality of electronic shops, said platform being arranged to support agent-based market interactions between a plurality of agent types, characterised in that said system is adapted to synchronize a real-time session for a user on an agent-enabled web-site with communications between agents of said user and said web-site using duel session identification. Said user's agent is preferably a personal assistant agent and said web-sites agent is preferably a store agent.

The telecommunications transmission system may be adapted to provide personalized and automated web-site browsing for a user. In which case, the personal assistant agent may be adapted to facilitate the provision of said personalized and automated web-site browsing facility.

The personal assistant agent may be adapted to send information about a user's
interests to said agent-based web-site, and said agent-based web-site may be adapted to
use said interest information to automatically display and promote products of interest to
said user, when said user accesses said web-site.

The personal assistant agent may be adapted to interact with said store agent to
effect transfer of user data, for example, the user's name, address and payment
arrangements, to facilitate automatic processing of said user's transactions on a web-site.

A user terminal may include a computer having a web-browser, and a user interface
between said web-browser and a personal assistant agent for said user. The personal
assistant agent may reside, at a given time, on said user's computer. Alternatively, the
personal assistant agent may reside, at a give time, on an Internet service provider's server.
The user interface may be a personal assistant service graphical user interface.

The agent-enabled web-site may include a merchant's commercial web-site having
a web-interface and a store agent associated therewith. The web-browser may be adapted
to interact with said web-interface, and said personal assistant agent may be adapted to
interact with said store agent.

The personal assistant agent may be adapted to communicate with said web-
browser to determine where said user is browsing and when an agent-enabled web-site has
been accessed.

The personal assistant agent may be adapted to communicates with other agents
when said user has accessed an agent-enabled web-site.

The web-browser/web-server and said personal assistant agent/store agent
interactions may respectively constitute first and second sessions for obtaining access to
said agent-enabled web-site services, and said telecommunications transmission system
may be adapted to use identical message identifiers for messages associated with said first
and second sessions.
The telecommunications transmission system may be adapted to enable a message identifier used for said web browser/web-server interactions to be reused for said personal assistant agent/store agent interactions.

The telecommunications transmission system may be adapted to enable data relating to said message identifier and agent-address to flow from said web-server to said web-browser, then from said web-browser to said personal assistant agent, via said user interface, and finally from said personal assistant agent to said store agent.

According to a second aspect of the present invention, there is provided, a user terminal for use in a telecommunications transmission system adapted to operate as a platform for an agent based electronic market, and including at least one service provider server, and a plurality of electronic shops, said platform being arranged to support agent-based market interactions between a plurality of agent types, characterised in that said user terminal is adapted for connection to the Internet, and includes a computer having a web-browser, and a user interface between said web-browser and a personal assistant agent for said user, in that said web-browser is adapted to interact with a web-interface of a merchants server to obtain access to an agent-enabled web-site, in that said personal assistant agent is adapted to interact with a store agent of said merchant's server, and in that said system is adapted to synchronize a real-time session for a user on said agent-enabled web-site with communications between said personal assistant agent and said store agent using duel session identification. The personal assistant agent may reside, at a given time, either on said user's computer, or on an Internet service provider's server. The user interface may be a personal assistant service graphical user interface. The agent-enabled web-site may include a merchant's commercial web-site having a web-interface and a store agent associated therewith. The web-browser may be adapted to interact with said web-interface, and said personal assistant agent may be adapted to interact with said store agent. The personal assistant agent may be adapted to communicate with said web-browser to determine where said user is browsing and when an agent-enabled web-site has been accessed. The personal assistant agent may be adapted to communicates with other agents when said user has accessed an agent-enabled web-site.
With the user terminal of the present invention, the web-browser/web-server and said personal assistant agent/store agent interactions may respectively constitute first and second sessions for obtaining access to said agent-enabled web-site services, and the telecommunications transmission system may be adapted to use identical message identifiers for messages associated with said first and second sessions. Said system may be adapted to enable a message identifier used for said web browser/web-server interaction to be reused for said personal assistant agent/store agent interactions. Said system may be adapted to enable data relating to said message identifier and agent-address to flow from the said web-server to said web-browser, then from said web-browser to said personal assistant agent, via said user interface, and finally from said personal assistant agent to said store agent.

According to third aspect of the present invention, there is provided, in a telecommunications transmission system adapted to operate as a platform for an agent based electronic market and including a plurality of user terminals arranged for connection to the Internet, at least one service provider server, and a plurality of electronic shops, said platform being arranged to support agent based market interactions between a plurality of agent types, a method of accessing an agent-enabled web-site of said electronic market, characterised by synchronizing a real-time session for a user on said agent-enabled web-site with communications between agents of said user and said web-site using duel session identification.

The method may be characterised in that said user's agent is a personal assistant agent and said web-sites agent is a store agent.

The method may be characterised by personalizing and automating web-site browsing facilities for said user.

The method may be characterised by said personal assistant agent providing said personalized and automated web-site browsing facilities for said user.
The method may be characterised by said personal assistant agent sending information about a user's interests to said agent-based web-site, and by said agent-based web-site using said interest information to automatically display and promote products of interest to said user, when said user access said web-site.

The method may be characterised by said personal assistant agent interacting with said store agent to effect transfer of user data to facilitate automatic processing of said user's transactions on a web-site. The method may be further characterised by characterised by said user data including, inter alia, the user's name, address and payment arrangements.

The method may be characterised by a web-browser of said user terminal interacting with a web-interface of a merchant's server, by a personal assistant agent of said user terminal interacting with a store agent of said merchant's server, and by said personal assistant agent communicating with said web-browser to determine where said user is browsing and when an agent-enabled web-site has been accessed. The method may be further characterised by said personal assistant agent communicating with other agents when said user has accessed an agent-enabled web-site.

The method may be characterised by said web-browser/web-server and said personal assistant agent/store agent interactions respectively constituting first and second sessions for obtaining access to said agent-enabled web-site, and by using identical message identifiers for messages associated with said first and second sessions. The method may be further characterised by a message identifier used for said web browser/web-server interaction being reused for said personal assistant agent/store agent interactions. The method may be further characterised by data relating to said message identifier and agent address flowing from the said web-server to said web-browser, then from said web-browser to said personal assistant agent, via user interface, and finally from said personal assistant agent to said store agent.

The method may be characterised by said user accessing said merchant's server for
a required service; said server, in response to said user access, sending a HTTP response, containing a 'first session id' to said user's web-browser, said response containing a code which identifies that the required service is agent-enabled; said web-browser transferring said 'first session id', together with the address of the service agent, to a user interface of said user terminal; said user terminal transferring said 'first session id' and service agent address to said personal assistant agent; and said personal assistant agent generating an agent message including a message id which is the same as said 'first session id', and using an agent communication protocol to communicate said agent message to said store agent and thereby inform said store agent that the message comes from the same source as said HTTP access. The method may be further characterised by said interaction between said web-browser and said user interface is effected using Java.

The foregoing and other features of the present invention will be better understood from the following description with reference to the accompanying drawings, in which:

Figure 1 diagrammatically illustrates, in the form of a block diagram, a high-level overview of the relationships between some basic functions/products related to an Agent-based Electronic Commerce Platform and Services;

Figure 2 diagrammatically illustrates, in the form of a block diagram, a layered model of an Agent-based Service Platform;

Figure 3 shows message/event types for an Agent-based Auctioneer Service;
Figure 4 diagrammatically illustrates, in the form of a block diagram, a general layered architecture for a translation agent that translates between different agent protocols, or from/to traditional http-based web-sites;

Figure 5 diagrammatically illustrates, in the form of a block diagram, a User Client Computer and a Merchant's Commercial Web Server and the manner in which a user can monitor and control his/her personal agent through a separate Telia WebButler Graphic User Interface;
Figure 6 diagrammatically illustrates, in the form of a block diagram, the different software modules in the Telia WebButler;

Figure 7 diagrammatically illustrates, in the form of a block diagram, a modified version of Figure 5 of the accompanying drawings; and

Figure 8 diagrammatically illustrates, in the form of a block diagram, a modified version of Figure 7 of the accompanying drawings.

As stated above, many companies have realized the impact and possibilities that agent orientated services will have on e-commerce on the Internet, both today and in the future. It will be seen from the subsequent description that the telecommunications system, according to the present invention, is adapted to provide:

- a platform for agent orientated electronic market place services, such as, the Agent-based Market Place (AMP) services offered by Telia; and

- duel session identification, i.e. the platform provided by the telecommunications network enables the session identifier used for the WWW communications to be reused in the agent communications, which overcomes the problems of existing agent orientated systems.

It will also be seen from the subsequent description that the telecommunications transmission system which is adapted to operate as a platform for an agent-based electronic market, includes a plurality of user terminals arranged for connection to the Internet, at least one service provider server, and a plurality of electronic shops. The platform is arranged to support agent-based market interactions between a plurality of agent types, and the telecommunications system is adapted to synchronize a real-time session for a user on an agent-enabled web-site with communications between agents of said user and said web-site using duel session identification.
A high-level overview of the relationships between some basic functions/products related to an Agent-based Electronic Commerce Platform and Services is diagrammatically illustrates in Figure 1 of the accompanying drawings, in the form of a block diagram.

The differences between known products/services, based on agent orientated architectures, and Telia’s Agent-based Market Place (AMP), are as follows:

(a) AMP enables peer-to-peer autonomous communication between agents on the Internet. These can be agents representing users wanting to buy and/or sell goods and services, merchants, brokers, etc.. This approach has the advantage that any agent can initiate a communication with other agents, computer programs, at any time. The agents can understand the information they receive and take action autonomously. They can, therefore, fulfill complex requests from their owner. The disadvantage is that additional data has to be created to support machine-to-machine communication because, at the present time, the web is structured to support man-machine and not machine-machine communication.

(b) Since the agents can manage the interest descriptions of their owners, it is possible to achieve more powerful, realtime relationship marketing when the owner visits e-commerce stores on the web. It is also possible for the merchant to develop the relationship with the owner/owners agent after the visit to his/her store.

(c) Based on its ability to support machine-to-machine communication, AMP makes it possible for users to specify, in a user-friendly manner, trigger-points when the user would like to come into the loop while the agent is working on a task. That could, for example, be when it is necessary to give an offer over a specified limit in a buying negotiation for a requested item.

(d) Giving the user a useful tool to facilitate obtaining status information about the different tasks the user’s agent is working on. This will, of course, also include the capability to:
if desired, manually take-over control for different tasks from the agent, and
change trigger-points and other important parameters, etc..

Since the agent is executing on a network operator’s servers, for example, Telia’s
servers in their telecommunications network, the user can access the agent through
any device, for example, a home computer, a computer at the user’s place of work,
a mobile PDA, and may even obtain notifications through pagers, GSM/SMS, etc..
This gives the user the additional benefit that he/she doesn’t need to be connected
on-line when the agent is working on the requested task while still giving the agent
the ability to urgently notify the user, as and when required, through the user’s
preferred telecommunication service.

Co-operation between agents, based on different technical platforms, can also be
achieved.

Agents can interface services, such as, reputation services, payment services,
logistic services etc..

Supports e-mail communications which makes it possible to communicate through
firewalls. Also creates a more easily used interface to EDI applications.

The foregoing mechanisms open-up new possibilities for electronic commerce in the
consumer-to-consumer, the business-to-consumer, as well as, the business-to-business
marketplace.

The Agent-based Market Place (AMP) introduces a new paradigm for the Internet
which opens up new possibilities for network operators, such as Telia, and their business
customers, partners and consumers. In 1996, Telia developed a Market Space prototype,
in co-operation with the Swedish Institute of Computer Science (STCS) and the Uppsala
University, which implemented basic protocols and mechanisms for an AMP. The technical
and commercial opportunities for AMP was successfully demonstrated by using the Market Space prototype in an electronic auction application.

An Agent-based Electronic Commerce Service Platform supports Agent Applications with necessary mechanisms making it fast and easy to implement new types of agent functionality/behaviour for electronic commerce. In order to achieve flexibility, a layered architecture, such as the layered model of an Agent-based Service Platform diagrammatically illustrated, in the form of a block diagram, in Figure 2 of the accompanying drawings can be used. As illustrated in Figure 2, the different layers of the model are as follows:

(1) Agent Specific Layer: Where different behaviour/functionality for agent applications are implemented. Typical examples are Telia WebButler, Telia InfoBroker, Telia MerchantAssist, Telia AgentFind, Telia Archive, and Telia Auction.

(2) Information Layer: Translation from internal representation to the Agent Communication Protocol used between Agents. Could, for example, be KQML or something similar.

(3) Interaction Layer: Creation/Parsing of messages (see Figure 2).

(4) Message Transfer Layer: Managing the physical Internet transfer of messages utilizing mechanisms like sockets, for example.

The Agent-based Market Place (AMP) Service Platform focuses on supporting electronic commerce applications. Figure 3 shows examples of messages managed in the Interaction Layer of Figure 2 for the auctioneer application. Other messages/event types can be created if needed for other applications, such as, index service, credit reporting service etc..
Another important aspect is that not all agents on the Internet will be based on this platform. It is, therefore, necessary to support an application that translates between different agent types. That service is also important when the agent applications access information based on traditional http format. Figure 4 of the accompanying drawings diagrammatically illustrates, in the form of a block diagram, the general layered architecture for this translation agent.

A new type of index service, provided by Telia, which has similarities with the search engines on the web is called AgentFind. The role of AgentFind is to inform agents/WebButlers about other agents/WebButlers having corresponding interest profiles, in order to make it possible for those agents to find each other. An important difference between AMPS and HTTP-based search engines is that this database will change much more rapidly. It is, therefore, necessary to implement mechanisms in the ACP (Agent Communication Protocol) that support consistency management between the AgentFind database and the interests stored at the users WebButlers. Another key issue is the rating mechanism related to the level of conformity between the interest specifications of different WebButlers. This mechanism has, for example, to take into consideration if specific parameters have been specified as mandatory, or optional.

Duel Session Identification, to which the present invention relates, is a mechanism which makes it possible to synchronize a real-time session for a user on a commercial Website with the dialogue between the user's WebButler and the commercial Web-site's corresponding Merchant Assist functionality. This makes it possible to create personalized real-time promotions etc. based on a user's actual interest profile.

Market Integration Agent ACP-HTTP is a mechanism which makes it possible for WebButler and other agents to utilize ordinary http-based information from conventional web-sites.

Market Integration Agent AMPI/ACP to other ACP is a mechanism which makes it possible for agents based on different technical platforms to communicate with each other.
Agent-based Payment Manager/Adaptor implements the functionality needed for managing payments from autonomous agents. The Payment Manager mechanisms utilize basic payment mechanisms provided by, for example, SEMPER.

Architecture for Agent-based Electronic Commerce Service Platform - this is the technical architecture the AMP services are built upon. It consists of agent specific layer, information layer, interaction layer and the message transfer layer.

The Agent-based Market Place (AMP) services are as follows:

(A) Telia WebButler:

- Negotiate and Auction;

- Interest editor for contracts;

- Trigger-point editor and priority;

- Accessability and Notification;

- Notification Calendar;

- Personal profile (address, interest, demography);

- Plug-in’s for different behaviour missions;

- Message Box;

- Advertisement Box;

- Bookmarks to other agents;
- Secure identification when accessing the personal WebButler;

- Identification during signing of contracts (CA, dig. signature, ...);

- Restriction mechanisms (inherit from parent to child, ...);

- Electronic wallet; and

- GUI.

(B) Telia InfoBroker:

- Telia AgentFind (index service that links together agents with similar interests);

- Telia Archive for signed contracts;

- Distribution of personal advertisements;

- Statistics of requested interests; and

- Interface to Pay Service.

(C) Telia Merchant Assist:

- Personal Advertisement Management;

- Relationship advertisement and dynamic WWW-promotion related to individual users unique interests;
- Loyalty programs;
- Interface to Telia Pay;
- Interface to Telia Distribute; and
- Statistics over consumer profiles.

The Telia WebButler Service has a user friendly interface through which the user can interact with agent-based and conventional WWW-based services on the Internet. The service is used through a separate window on the user's computer (see Figure 5 of the accompanying drawings). This means that the Telia WebButler can co-operate with other services that the user accesses through TCP/IP, for example, through his/her conventional web-browser (Netscape, Explorer, etc.). It is, however, possible for the Telia WebButler to also operate when the owner is disconnected from the network through e-mail EDI messages etc..

The benefit of WebButler is that the agent at the user's server and the agent at the visited web-site can communicate interests and transfers basic data between each other. The result is that there is no need for the person concerned to manually type-in requested information at the site. An even larger benefit for the user is that the site knows about the user's interest. This means that the user will be presented with, for him/her, valuable information directly by the site instead of receiving the standard information that all users receive. This is not only an advantage for the user, since commercial web-sites can use this information for relationship marketing, so that this information is valuable for both parties.

Figure 5 of the accompany drawings diagrammatically illustrates a User Client Computer and a Merchant’s Commercial Web Server. The user can monitor and control his/her personal agent through a separate Telia WebButler Graphical User Interface on the screen. The primary purpose of the Telia WebButler service is, however, to control and monitor the personal agent which operates on a net-based server. This means that the user
can initiate processes for the agent through any suitable device available at the time, for example, a home computer, a computer at his/her place of work, a mobile PDA with a cellular connection to the Internet, etc.. This, for example, enables the user to specify a negotiation strategy for the agent, trigger-points when the user will be informed/involved in further decisions etc., and to order the agent to begin the negotiation/bidding. The user can then disconnect himself/herself from the network and the agent will continue the task it is executing on a server, for example, Telia's server, in the network.

When a trigger-point is reached, the agent informs the user by means of the requested media. This could be through a message on the Telia WebButler, for example, complemented with a message on the user's pager, GSM/SMS etc., if the user has identified the trigger-point as urgent. The user can then access his WebButler through any available suitable device, to analyze the received information and give the agent further directions. The user can of course also elect to finish the bidding etc. manually after the agent has completed the routine work necessary to reach this important point in the process.

Figure 6 diagrammatically illustrates the different software modules in the Agent Specific layer implementing, in this case, the WebButler.

The User Interface of Figure 6 implements a user friendly window on the users screen. It is based on easily understandable icons for processes and events. When the user clicks on the icons, he/she receives more detailed information on current status, collected information etc.. The user can, in addition, easily control the agent's action by specifying trigger-points etc..

The Interaction Plug-Ins of Figure 6 implement the User Interface to different, or improved, agent applications/behaviour. For example, an agent specialized for electronic auctions (negotiation, strategy, etc.) may include an interface towards index agents necessary to obtain information concerning the location of interesting auctions which include specified items, credit reporting service making sure that the auctioneer's operation is run by a solid company etc.. The Interaction Plug-Ins therefore provide basic mechanisms for
different kinds of applications/behaviour.

The Session Manager of Figure 6 implements the management of the processes necessary to perform the requested tasks. This includes creation of the messages necessary to perform the task, interpret received messages, halt the process and notify the owner of the agent if a trigger-point has been met etc. The logic necessary to perform the requested tasks is, therefore, implemented in the Session Manager module.

The Database of Figure 6 manages all data necessary for operating the Personal Agent Service. This includes specifications of the owner's interests upon which the requested missions are based, messages received and transmitted, status information on the sessions, locally stored addresses to agents/agent sites which have worked well during earlier missions etc. The database also stores the requested information which the agent collects through the mission in order to be able to present it to the owner as, and when, requested.

The Telia Merchant Assist includes the necessary functionality for providing realtime personalized promotions to visitors to commercial web sites. The mechanisms also support real-time marketing to consumers after a visit to the store.

The Telia InfoBroker Service includes Telia AgentFind, Telia Archive and Telia Auction. Telia MerchantAssist will have an interface to Telia Pay and Telia Distribute.

The InfoBroker Service sells:

- advertisement distribution to interested companies - the advertisements are attached to the WebButler's Ad-Box when requests are made from AgentFind; and

- market statistics collected by AgentFind when requests are made - this makes it possible for companies to identify product areas frequently
requested by WebButlers and to compare the market's ability to satisfy the demand.

Telia Archive stores electronic contracts. Telia Distribute integrates necessary functionality for the delivery services.

As previously stated, in order to avoid a merchant coming to the wrong conclusions, concerning a customer's interests, it would be of advantage to the merchant if he/she could automatically be given instant knowledge of the customer's interests by the customer himself but, because HTTP does not support transfer of interest information, this would necessitate the use of a separate protocol. This, as previously stated, would require the use of both HTTP and an agent communication protocol, and give rise to the need to determine whether the communication via both channels is to/from the same source.

Figure 7 of the accompanying drawings, which is a modified version of Figure 5, illustrates, in the form of a block diagram, the manner in which interactions are effected between a User Client Computer and a Merchant's server.

The arrangement of Figure 7, includes two blocks, one of which is the User Client Computer (program) and the other one of which is the Merchant's Server. The User Client Computer includes a user interface, i.e. a Personal Assistant Service Graphical User Interface (PA-GUI), which is located adjacent to the User's Web-browser (Netscape Communicator), and a Personal Assistant Agent which may be located either on the User Client Computer, as shown in Figure 7, or somewhere else, for example, on an Internet service provider's server. The Merchant's Server includes a Web-interface and a Store Agent.

The manner in which internal communications are effected in the User Client Computer is shown in Figure 7. The Personal Assistant Agent communicates with the Web-browser in order to determine where the User is browsing and when an agent-enabled website has been accessed. The Personal Assistant Agent also communicates with other
agents when the User has accessed an agent-enabled web-site.

When the User starts to interact with an agent-enabled service there will, as shown in Figure 7, be one session between the Web-browser and Merchant's Server (Session 1) and another session between the two Agents (Session 2). The problem with this arrangement is that the Merchant's Store Agent does not know which session of HTTP-accesses should be paired with a given session of Agent messages. The reason for this is that Agent messages and HTTP-requests both have their own message identifiers, which are used to group messages together into sessions.

The procedure used for identification of a session on the WWW normally involves the use of an identifier which the Web-browser always sends, together with the HTTP-requests. The Agent approach is quite similar. The solution, according to the present invention, for overcoming this problem is to use the normal procedure for the WWW and for the session identifier, used for WWW communications, to be reused in the Agent communications (see Figure 8 of the accompanying drawings).

As illustrated in Figure 8, information relating to the identifier and Agent-address flows from the service Web-server to the Web-Browser, then to the Personal Assistant Agent, via PA-GUI, and finally to the service agent (Merchant's Store Agent).

A more detailed explanation for the information flows, referred to above, which are respectively represented in Figure 8 by the lines 1 to 4, is set out below:

(a) Step 1 (Line 1): The User has accessed the Web-server for the required service and thus received the first session id, or Cookie, from the HTTP response. The User's Web-browser now has the information concerning the Cookie (first session id).

(b) Step 2 (Line 2): The Web-page that the HTTP response contains has a code which identifies that the service is agent-enabled. This is
done using Java and Java Script. The Cookie information (first session id) is, therefore, given to the PA-GUI of the User Client Computer, together with the address of the service agent, using Java.

(c) Step 3 (Line 3): The PA-GUI sends the Cookie information (first session id) and the address of the service agent to the Personal Assistant Agent of the User Client Computer.

(d) Step 4 (Line 4): The Personal Assistant Agent generates an agent message and uses an agent communication protocol to communicate with the service agent (Store Agent). This message includes a message id, which is the same as the Cookie (session id of Step 1). This means that the service agent will know that the message comes from the same source as the HTTP access (see Step 1).

On completion of this process, it is possible to pair the two sessions together and have interaction between the Personal Assistant Agent and the other Agents which is more effective than web-interaction (or agent-interaction) itself.

It will be seen from the foregoing that, when a user accesses a merchant's server for a required service, the server will, in response to the user access, send a HTTP response, containing a 'first session id' to the user's web-browser. The response also contains a code which identifies that the required service is agent-enabled. The web-browser then transfers the 'first session id', together with an address of the service agent, to the user interface of the user terminal. The user terminal then transfers the 'first session id' and service agent address to the personal assistant agent which generates an agent message including a message id that is the same as the 'first session id', and uses an agent communication protocol to communicate the agent message to the store agent and to thereby inform the store agent that the message comes from the same source as said HTTP access. The
interaction between the web-browser and the user interface is preferably effected using Java.

It will be directly evident to persons skilled in the art that the present invention can be used to facilitate personalization and automation when browsing web-based services. In particular, the present invention can be used for personalization when a user accesses an agent-enabled commercial web-site, for example, a store like amazon.com, and will enable a personal assistant agent to send information about the user’s interests to the commercial web-site. This will enable the web-site to display and promote the products in which the user is directly interested. Also, the invention can be used, together with the Personal Assistant Agent, for automating interaction between a User and a store, for example, to transfer customer data, such as, the user’s name, address and payment arrangements, which would otherwise have to be entered manually, when a purchase is completed.

Personalization systems which use behaviour observations to create customer profiles, are not a reliable means of determining whether a visitor to a commercial web-site is likely to be interested in the same type of information/product at the third visit as he/she was during the first and second visits. This means of monitoring and/or obtaining information on client behaviour at commercial web-sites, is clearly less accurate than the solution proposed by the present invention. This solution is completely decentralized, each user has control over his/her own interest information (typically in a personal assistant agent) and is able to send this information to the service, when accessing it, to facilitate instant personalization.
CLAIMS

1. A telecommunications transmission system adapted to operate as a platform for an agent-based electronic market and including a plurality of user terminals arranged for connection to the Internet, at least one service provider server, and a plurality of electronic shops, said platform being arranged to support agent-based market interactions between a plurality of agent types, characterised in that said system is adapted to synchronize a real-time session for a user on an agent-enabled web-site with communications between agents of said user and said web-site using duel session identification.

2. A telecommunications transmission system, as claimed in claim 1, characterised in that said user's agent is a personal assistant agent and said web-sites agent is a store agent.

3. A telecommunications transmission system, as claimed in claim 2, characterised in that said system is adapted to provide personalized and automated web-site browsing for a user.

4. A telecommunications transmission system, as claimed in claim 3, when appended to claim 2, characterised in that said personal assistant agent is adapted to facilitate the provision of said personalized and automated web-site browsing facility.

5. A telecommunications transmission system, as claimed in claim 4, characterised in that said personal assistant agent is adapted to send information about a user's interests to said agent-based web-site, and in that said agent-based web-site is adapted to use said interest information to automatically display and promote products of interest to said user, when said user accesses said web-site.

6. A telecommunications transmission system, as claimed in claim 4, or claim 5, characterised in that said personal assistant agent is adapted to interact with said store agent to effect transfer of user data to facilitate automatic processing of said user's
transactions on a web-site.

7. A telecommunications transmission system, as claimed in claim 6, characterised in that said user data includes, inter alia, the user's name, address and payment arrangements.

8. A telecommunications transmission system, as claimed in any previous claim, characterised in that a user terminal includes a computer having a web-browser, and a user interface between said web-browser and a personal assistant agent for said user.

9. A telecommunications transmission system, as claimed in claim 8, characterised in that said personal assistant agent resides, at a given time, on said user's computer.

10. A telecommunications transmission system, as claimed in claim 8, characterised in that said personal assistant agent resides, at a give time, on an Internet service provider's server.

11. A telecommunications transmission system, as claimed in any of claims 8 to 10, characterised in that said user interface is a personal assistant service graphical user interface.

12. A telecommunications transmission system, as claimed in any previous claim, characterised in that said agent-enabled web-site includes a merchant's commercial website having a web-interface and a store agent associated therewith.

13. A telecommunications transmission system, as claimed in claim 12, when appended to any of claims 8 to 12, characterised in that said web-browser is adapted to interact with said web-interface, and said personal assistant agent is adapted to interact with said store agent.

14. A telecommunications transmission system, as claimed in claim 13, characterised
in that said personal assistant agent is adapted to communicate with said web-browser to determine where said user is browsing and when an agent-enabled web-site has been accessed.

15. A telecommunications transmission system, as claimed in claim 13, or claim 14, characterised in that said personal assistant agent is adapted to communicates with other agents when said user has accessed an agent-enabled web-site.

16. A telecommunications transmission system, as claimed in any of claims 13 to 15, characterised in that said web-browser/web-server and said personal assistant agent/store agent interactions respectively constitute first and second sessions for obtaining access to said agent-enabled web-site services, and in that said system is adapted to use identical message identifiers for messages associated with said first and second sessions.

17. A telecommunications transmission system, as claimed in claim 16, characterised in that said system is adapted to enable a message identifier used for said web browser/web-server interactions to be reused for said personal assistant agent/store agent interactions.

18. A telecommunications transmission system, as claimed in claim 17, characterised in that said system is adapted to enable data relating to said message identifier and agent-address to flow from said web-server to said web-browser, then from said web-browser to said personal assistant agent, via said user interface, and finally from said personal assistant agent to said store agent.

19. A user terminal for use in a telecommunications transmission system adapted to operate as a platform for an agent-based electronic market, and including at least one service provider server, and a plurality of electronic shops, said platform being arranged to support agent-based market interactions between a plurality of agent types, characterised in that said user terminal is adapted for connection to the Internet, and includes a computer having a web-browser, and a user interface between said web-browser and a personal
assistant agent for said user, in that said web-browser is adapted to interact with a web-interface of a merchants server to obtain access to an agent-enabled web-site, in that said personal assistant agent is adapted to interact with a store agent of said merchant's server, and in that said system is adapted to synchronize a real-time session for a user on said agent-enabled web-site with communications between said personal assistant agent and said store agent using duel session identification.

20. A user terminal, as claimed in claim 19, characterised in that said personal assistant agent resides, at a given time, on said user's computer.

21. A user terminal, as claimed in claim 19, characterised in that said personal assistant agent resides, at a given time, on an Internet service provider's server.

22. A user terminal, as claimed in any of claims 19 to 21, characterised in that said user interface is a personal assistant service graphical user interface.

23. A user terminal, as claimed in any of claims 19 to 22, characterised in that said agent-enabled web-site includes a merchant's commercial web-site having a web-interface and a store agent associated therewith.

24. A user terminal, as claimed in claim 23, when appended to any of claims 19 to 22, characterised in that said web-browser is adapted to interact with said web-interface, and said personal assistant agent is adapted to interact with said store agent.

25. A user terminal, as claimed in claim 24, characterised in that said personal assistant agent is adapted to communicate with said web-browser to determine where said user is browsing and when an agent-enabled web-site has been accessed.

26. A user terminal, as claimed in claim 24, or claim 25, characterised in that said personal assistant agent is adapted to communicates with other agents when said user has accessed an agent-enabled web-site.
27. A user terminal, as claimed in any of claims 24 to 26, characterised in that said web-browser/web-server and said personal assistant agent/store agent interactions respectively constitute first and second sessions for obtaining access to said agent-enabled web-site services, and in that said system is adapted to use identical message identifiers for messages associated with said first and second sessions.

28. A user terminal, as claimed in claim 27, characterised in that said system is adapted to enable a message identifier used for said web browser/web-server interaction to be reused for said personal assistant agent/store agent interactions.

29. A user terminal, as claimed in claim 28, characterised in that said telecommunications transmission system is adapted to enable data relating to said message identifier and agent-address to flow from the said web-server to said web-browser, then from said web-browser to said personal assistant agent, via said user interface, and finally from said personal assistant agent to said store agent.

30. In a telecommunications transmission system adapted to operate as a platform for an agent based electronic market and including a plurality of user terminals arranged for connection to the Internet, at least one service provider server, and a plurality of electronic shops, said platform being arranged to support agent based market interactions between a plurality of agent types, a method of accessing an agent-enabled web-site of said electronic market, characterised by synchronizing a real-time session for a user on said agent-enabled web-site with communications between agents of said user and said web-site using duel session identification.

31. A method, as claimed in claim 30, characterised in that said user's agent is a personal assistant agent and said web-sites agent is a store agent.

32. A method, as claimed in claim 30, or claim 31, characterised by personalizing and automating web-site browsing facilities for said user.
33. A method, as claimed in claim 32, when appended to claim 31, characterised by said personal assistant agent providing said personalized and automated web-site browsing facilities for said user.

34. A method, as claimed in claim 33, characterised by said personal assistant agent sending information about a user's interests to said agent-based web-site, and by said agent-based web-site using said interest information to automatically display and promote products of interest to said user, when said user access said web-site.

35. A method, as claimed in claim 33, or claim 34, characterised by said personal assistant agent interacting with said store agent to effect transfer of user data to facilitate automatic processing of said user's transactions on a web-site.

36. A method, as claimed in claim 35, characterised by said user data including, inter alia, the user's name, address and payment arrangements.

37. A method, as claimed in any of claims 30 to 36, characterised by a web-browser of said user terminal interacting with a web-interface of a merchant's server, by a personal assistant agent of said user terminal interacting with a store agent of said merchant's server, and by said personal assistant agent communicating with said web-browser to determine where said user is browsing and when an agent-enabled web-site has been accessed.

38. A method, as claimed in claim 37, characterised by said personal assistant agent communicating with other agents when said user has accessed an agent-enabled web-site.

39. A method, as claimed in any of claim 37, or claim 38, characterised by said web-browser/web-server and said personal assistant agent/store agent interactions respectively constituting first and second sessions for obtaining access to said agent-enabled web-site, and by using identical message identifiers for messages associated with said first and second sessions.
40. A method, as claimed in claim 39, characterised by a message identifier used for said web browser/web-server interaction being reused for said personal assistant agent/store agent interactions.

41. A method, as claimed in claim 40, characterised by data relating to said message identifier and agent address flowing from the said web-server to said web-browser, then from said web-browser to said personal assistant agent, via user interface, and finally from said personal assistant agent to said store agent.

42. A method as claimed in any of claims 37 to 41, characterised by:

- said user accessing said merchant’s server for a required service;

- said server, in response to said user access, sending a HTTP response, containing a ‘first session id’ to said user’s web-browser, said response containing a code which identifies that the required service is agent-enabled;

- said web-browser transferring said ‘first session id’, together with the address of the service agent, to a user interface of said user terminal;

- said user terminal transferring said ‘first session id’ and service agent address to said personal assistant agent; and

- said personal assistant agent;

- generating an agent message including a message id which is the same as said ‘first session id’; and

- using an agent communication protocol to communicate said agent message to said store agent and thereby inform said store agent that the message comes from the same source as said HTTP access.
43. A method as claimed in claim 42, characterised by said interaction between said web-browser and said user interface is effected using Java.
FIGURE 2

A

1. Agent A would like to notify Agent B of its interest

2. A's interest is translated from internal to external representation

3. A message of type TELL is

4. The message is sent through the Internet by, for example, a socket interface

5. A bit string is transferred over TCP/IP

B

Agent specific

9. B receives information about Agent A's interest

8. The content of the message, the expression of interest, is translated to internal

7. The message is parsed

6. The message is received

INTERNET
<table>
<thead>
<tr>
<th>RECEIVED MESSAGE EVENT</th>
<th>BEHAVIOUR OF AUCTIONEER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask (A, Auct, EOI)</td>
<td>A buy/sell request to A with a specification of the item/interest</td>
</tr>
<tr>
<td>Tell (A, Auct, EOI)</td>
<td>A proposal from A to buy/sell with a specification of the item/interest</td>
</tr>
<tr>
<td>Negotiate (A, Auct, EOI)</td>
<td>If EOI (Expression Of Interest) indicates that A is interested in buying what the Auct (Auctioneer) is selling, the last offer is sent to A in an Offer message. If there is no offer, the initial request is sent to A in a Negotiate message. A is then a participant in the auction and will receive information about given offers from other participants.</td>
</tr>
<tr>
<td>Offer(A, Auct, EOI)</td>
<td>If EOI corresponds to a new highest offer for the item on sale, this offer is distributed in Offer messages to all participants in the auction. In another case, the highest offer is sent back to A. If this was the first offer from A, A is included as a member in the auction. (The Offer message is legally binding, which is not the case for the negotiate message)</td>
</tr>
<tr>
<td>Accept (A, Auct)</td>
<td>A is informed by the auctioneer that his/her offer is accepted and the auction of the item is finished.</td>
</tr>
<tr>
<td>Decline (A, Auct)</td>
<td>If this message is sent from the Auctioneer, A is informed that the auction is finished and that somebody else purchased the item. If the same message is sent from A, the Auctioneer is informed that A is no longer interested in participating in the auction. A will not receive new offers.</td>
</tr>
<tr>
<td>Timeout (time)</td>
<td>The auction expires when the timeout message is received. The auction could either be operated during a specified time period, or the auction could end when the time period between two offers is longer than a specified time interval.</td>
</tr>
</tbody>
</table>

**FIGURE 3**
FIGURE 6