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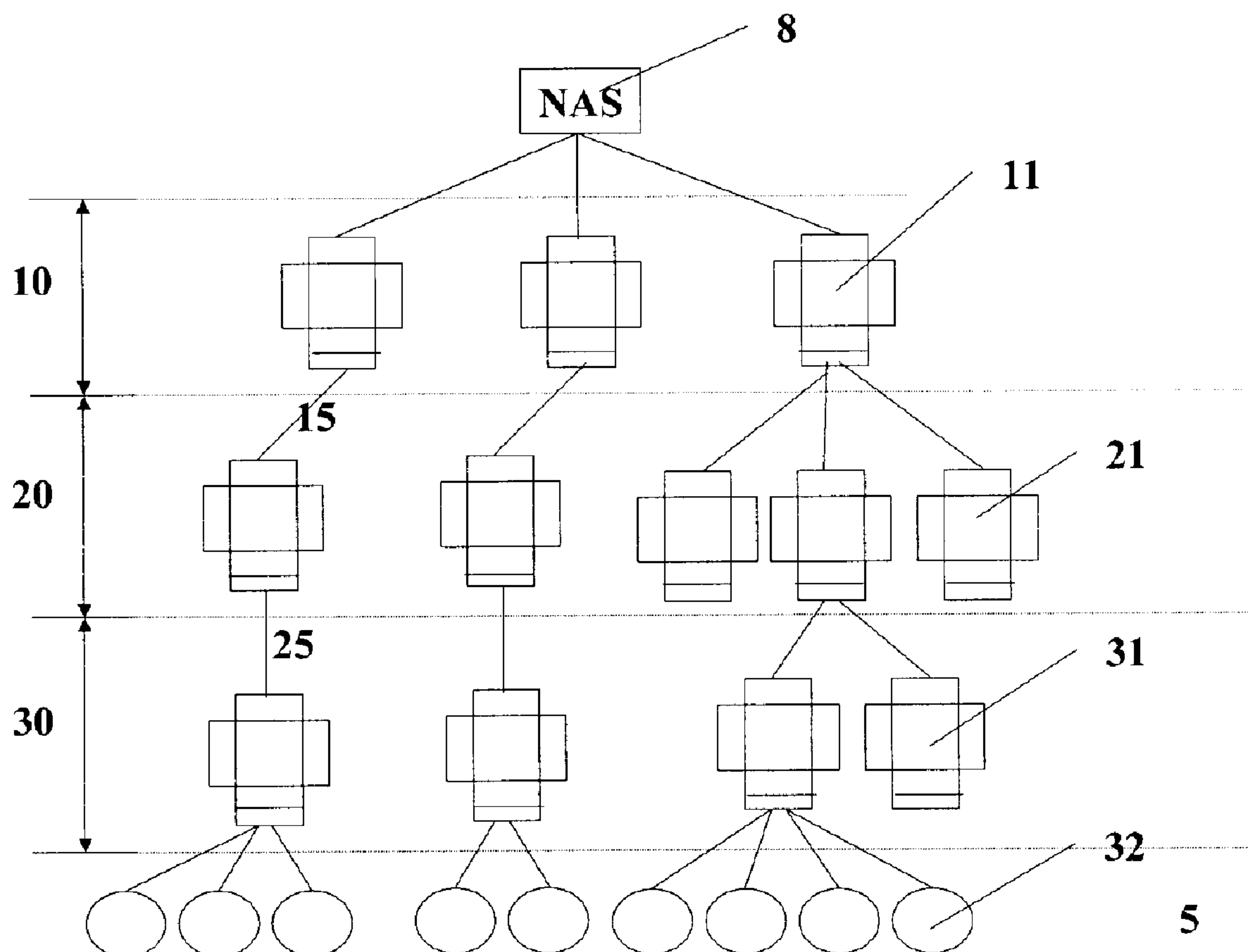
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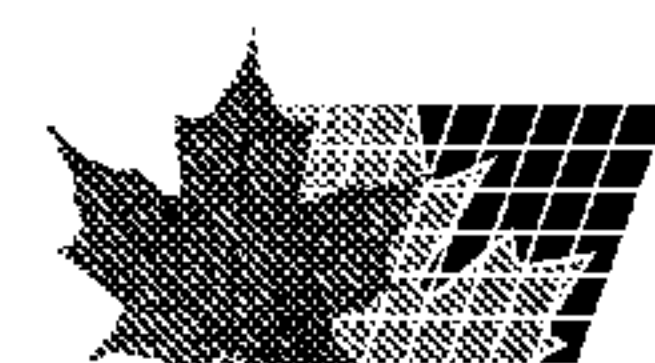
(54) Titre : SYSTEME ET METHODE DE GENERATION DYNAMIQUE D'UN PORTAIL CENTRE SUR L'UTILISATEUR

(54) Title: SYSTEM AND METHOD FOR DYNAMICALLY GENERATING A USER-CENTRIC PORTAL



(57) Abrégé/Abstract:

The present invention relates to a system and method for dynamically generating a user-centric portal in a hieratically distributed and layered network. The layered network structure is physically, virtually, or both physically and virtually constructed for grouping



(57) **Abrégé(suite)/Abstract(continued):**

or categorizing users within the network and for providing high level of privacy and security without sacrificing accessibility, availability, and flexibility of the user-centric portal.

ABSTRACT

The present invention relates to a system and method for dynamically generating a user-centric portal in a hieratically distributed and layered network. The layered network structure is physically, virtually, or both physically and virtually constructed for grouping or categorizing users within the network and for providing high level of privacy and security without sacrificing accessibility, availability, and flexibility of the user-centric portal.

SYSTEM AND METHOD FOR DYNAMICALLY GENERATING A USER-CENTRIC PORTAL

FIELD OF THE INVENTION

The present invention relates to a system and method for dynamically
5 generating a user-centric portal in a hieratically layered network of distributed stake
master servers.

BACKGROUND OF THE INVENTION

The Internet has expanded its horizon and has been making vast amount of
information available to its users. As the result, the Internet becomes a disorganized
10 database of various information with a lack of disciplinary and comprehensive
indexes or directory of metadata to differentiate or categorize information. The
Internet users have been struggling with the massive amount of information due to the
lack of effective tools to discriminate or segregate “useful” information for the users
from others.

15 Development and deployment of portals are one way to address such issues by
grouping information with particular interests or categories. There are a number of
portal sites that are available and popular among Internet users, such as YAHOO!®,
MSN®, Google® and a few other major portals. These websites also provide features
for its users to create and personalize their own portal based on their personal
20 preferences or profile information. However, as the numbers of users for these
websites grew drastically over the last few years, Internet traffic concentrations to
these popular portals have been seriously degrading its services to the users. The
system structures or models that these portal sites adapted have further accelerated the
traffic concentration. There have been a number of solutions introduced or deployed
25 to address such issues; however, scalability without sacrificing capability to
personalize and customize portals by the users has always been an issue for the portal
providers. It also makes the system difficult to scale its capacity, and to provide a

flexibly customizable portal to its users.

Another issue with centralized portal sites or solution is that, for regional Internet service providers or regional commercial / business operations, there is no efficient and effective ways to integrate their commercial interests or stakes with these popular portals. Quite often, they would need to spend extra amount of money to obtain a global presence in these portals, even though, what they really need is a regional presence in these portals, thus quite often, they need to develop their own portal to attract the regional users.

These popular portals failed to provide a method to integrate with a user's home network. As the number of home network deployment increases, there is an increasing demand on easy accessibility to the home network through the portal; however, these portal sites do not provide such flexibility.

The other issue with these popular web portals relates to its security and protection of its users' personal information, due to the fact that these portals are open to the greater general public. The centralized system structures and weak authentication mechanism even worsen its vulnerability.

Due to various needs and diverse interests of users, each portal has attracted different users with different interests. Due to this diversity, each user is required to access different web sites / portals accordingly. Quite often, accesses to these portals are not interoperable or common, thus independent authentication is required for each portal site. As the result, the users have to memorize as many passwords and usernames as the number of web sites or web services that the users need to access.

It would be desirable to provide a system and method for dynamically generating a user-centric portal in a hieratically layered and distributed network, comprising a gate master, local master and home master servers at each serving layer addressing aforementioned problems of existing portals.

SUMMARY OF THE INVENTION

The present invention relates to a system and method for dynamically generating a user-centric portal in a hieratically layered and distributed network. The

layered network structure is physically, virtually, or both physically and virtually constructed for grouping or categorizing users within the network and for providing high level of privacy and security without sacrificing accessibility, availability, and flexibility of the user-centric portal.

5 According to one aspect of the invention, it provides a system for dynamically generating a user-centric portal in a hieratically layered and distributed network, comprising: a network access server, aggregating a plurality of first stake master servers; each of the plurality of the first stake master servers aggregating a plurality of second stake master servers establishing first communication links therewith; each of
10 the plurality of the second stake master servers aggregating a plurality of third stake master servers establishing second communication network links therewith; each of the plurality of the third stake master servers aggregating a plurality of home devices for forming home networks; wherein the first, the second, and the third stake master servers are servers of web services, comprising user management system, service
15 integration engine, resource organizer, network management system and database; and wherein one of the first, the second and the third stake master servers first receives a request for the user-centric portal for a user directly or through said network access server from a browser with a user identification and password, the request is redirected to a corresponding one of the first, the second and the third stake
20 master servers based on profile of the user stored in said database of the stake master server first received the request, the user management system of the corresponding server authenticating said user based on the profile of the user stored in the database of the corresponding stake master server, and the corresponding stake master server dynamically generates the user-centric portal by integrating services from associated
25 ones of the first, the second and the third stake master servers based on the profile of the user and profiles of stakeholders associated with the user.

 According to another aspect of the invention, it provides a method for dynamically generating a user-centric portal in a hieratically layered and distributed network, comprising the steps of: (i) receiving a request for the user-centric portal at
30 one of first stake master servers, second stake master servers and third stake master servers from a user through a browser with user identification and password; wherein the first, second and third stake master servers are servers of web services; wherein the first stake master servers are aggregated by the network access server; wherein

each of the first stake master servers aggregating a plurality of the second stake master servers establishing first communication network links therewith; wherein each of the plurality of the second stake master servers aggregating a plurality of the third stake master servers establishing second communication network links therewith; and wherein each of the plurality of third stake master servers aggregating a plurality of home devices; (ii) redirecting the request to a corresponding one of the first stake master servers, second stake master servers and the third stake master servers depending on the profile of the user stored in a database at the stake master server that received the request; (iii) authenticating the user at the corresponding stake master server; (iv) generating the user-centric portal on the corresponding stake master server based on the profile of the user integrating services from associated ones of the first, the second, and the third stake master servers; and (v) transmitting the user-centric portal to the browser in response to the request by the user.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail with reference to the accompanying drawings, in which:

Figure 1 illustrates a tree structure of a hierarchically layered network of distributed stake master servers in a preferred embodiment of the present invention;

Figure 2 illustrates a stake master monomer of the preferred embodiment of the present invention;

Figure 3 illustrates a stakeholder-oriented architecture of the preferred embodiment of the present invention;

Figure 4 illustrates a gate service layer of gate stakeholder of the preferred embodiment of the present invention;

Figure 5 illustrates a local service layer of local stakeholder of the preferred embodiment of the present invention;

Figure 6 illustrates a home service layer of home stakeholder of the preferred embodiment of the present invention;

Figure 7 illustrates an overall system component schematic diagram of the preferred embodiment of the present invention;

Figure 8 illustrates a structure of the database of the preferred embodiment of the present invention;

5 Figure 9 illustrates a block diagram of an access control of the user management system in the preferred embodiment of the present invention;

Figure 10 illustrates a block diagram of a data sharing mechanism over P2P file sharings in the preferred embodiment of the present invention;

10 Figure 11 illustrates a block diagram for a peer-to-peer (or P2P) distribution of system mirror image in the preferred embodiment of the present invention;

Figure 12 illustrates a frame structure of a service bus interface for integrating resource access of the preferred embodiment of the present invention;

15 Figure 13 illustrates a conceptual view of generation of customized service bus interface for each stakeholder in the preferred embodiment of the present invention;

Figure 14 illustrates an intuitive layout of gate page for smooth data access and exchange in the preferred embodiment of the present invention;

20 Figure 15 illustrates a common area of the navigation page for home control and transaction processing frame in the preferred embodiment of the present invention;

Figure 16 illustrates a conceptual view of service categories of resources based on interest of a targeted home user in the preferred embodiment of the present invention;

25 Figure 17 illustrates a block diagram for compilation of service repository process by data extraction and data transformation in the preferred embodiment of the present invention;

30 Figure 18-a illustrates a block diagram identifying features utilized for updating of gate service bus interface and local service bus interface through a staging server in the gate service layer in the preferred embodiment of the present invention; and

Figure 18-b illustrates a block diagram identifying features utilized for updating of home service bus interface in the preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

5 A system and method for dynamically generating a user-centric portal in a hieratically layered and distributed network is disclosed.

Figure 1 illustrates a tree structure of a hierarchically layered network of distributed stake master servers in a preferred embodiment of the present invention. The stake master server is a server of web services controlled by a stakeholder,
 10 comprising a user management system, service integration engine, resource organizer, network management system and database. The stakeholder is a person or a legal entity that has interests or stakes in the system 5, such as local or regional service providers, e-business providers, local or regional content providers, etc. An Internet service provider constructs its system 5 comprising a network access server (or NAS)
 15 8, aggregating a plurality of first stake master servers, or gate masters 11 for forming a gate service layer 10.

Under the gate service layer 10, the system 5 comprises a local service layer 20. Each of the gate masters 11 aggregates a plurality of second stake master servers, or local masters 21 in the local service layer 20. From the user's perspective, each of
 20 the local masters 21 is segregated from other local masters 21, physically, logically or both physically and logically, and establishes a distinct communication network link 15 with the gate master 11 that this local master 21 belongs to. In the preferred embodiment of the present invention, the communication network link 15 between the gate master 11 and the local master 21 is established over a virtual private network.

25 A plurality of third stake master servers, or home masters 31, are situated or aggregated under each of the local masters 21, forming a home master layer 30. In the similar way, from the user's perspective, each of home masters 31 is segregated physically, logically or both physically and logically from other home masters 31 and establishes a distinct communication link 25 with the local master 21 to which this
 30 home master 31 belongs. In the preferred embodiment of the present invention, the

communication network link **25** between the local master **21** and the home master **31** is established over a virtual local area network.

Each of home masters **31** aggregates a plurality of home devices **32**, segregating the home devices **32** physically, logically or both physically and logically from the home devices **32** under the other home masters **31**. As the result of this layered and physically, virtually, or virtually and physically segregated network structure, the system **5** provides a very secure and protected network environment to its users for accessing the home network **34** (not shown). In the system **5**, the gate masters **11** and local masters **21** have fixed IP addresses; whereas the home masters **31** and home devices **32** may have dynamically assigned IP addresses.

It is to be noted that the communication network link **15** may be dynamically established as required. In the similar way, the communication network link **25** may also be dynamically established as required.

It is also to be noted that each layer provides necessary functionality to the network. The layers do not need to be implemented as distinct physical entities, but can be implemented in routers or switches, represented by a physical media, or combined in a single box. A hybrid hierarchical network may contain redundant routers and switches to meet policy requirements at each serving layer.

There may be required to have more than three layers, due to some complexities in business and/or regional service requirements. The present invention may allow having additional sub-layers, especially in the local service layer **20** as required. On the other hand, the present invention may also allow omitting a particular layer (likely, local service layer **20**) if the business or/and regional service requirements are simple enough to do so. However, in either case, the network hierarchy shall be maintained.

Figure **2** illustrates a stake master monomer **40** of the preferred embodiment of the present invention. The stake master monomer **40** is a fundamental and common platform pattern, can be configured for a specific role and / or modified to provide a specific functions and features, such as gate master **11** (not shown), local master **21** (not shown) and home master **31** (not shown). The stake master monomer **40** comprises five fundamental features, namely a user management system **41**, service integration **42**, resource organizer **43**, network management **44** and database **45**. The

user management system **41** includes administering a multiple level user authentication and authorization, and user profile management. The service integration **42** is an integration engine for integrating various application and services from the same service layer to the user. The resource organizer **43** is a resource and
 5 content management engine to organize resources and contents available on the system **5**, enabling the system **5** to grow in its size and depth. The resource organizer **43** also includes a web server feature. The network management **44** is for managing a segregated portion of network under the stake master server, including managing a virtual private network / virtual local area network, a dynamic host control protocol
 10 (or DHCP) server, a domain name server (or DNS), a dynamic domain name server (or DDNS) server, etc. The database **45** manages all the data required for aforementioned subsystems of stake master monomer **40**, including user profiles, stake holders' profiles, system profiles, stakeholder proprietary information, etc.

The user management system **41** administers and provides multiple levels of
 15 user authentication mechanism, such as those provided by a RADIUS[®] server or Shibboleth (an authentication and authorization middleware developed by Internet 2) using credentials such as password, encryption, biometric or digital signature, etc, to grant access to users to various servicing layers of the network.

Unlike those existing popular portals, in the preferred embodiment of the
 20 present invention, a stakeholder generates a user name and initial password, and initial user profile information, including, but not limited to, user credential, attributes and electronic certificates, for each of the users for registration. The registered user information is stored at the database **45** of stake master monomer **40** of a corresponding serving layer level. At each stake master server, there is an
 25 administrator who has the privilege to add, delete, and update the user information in the database **45**. In the preferred embodiment of the present invention, the stakeholder identifies all users under its user group by legal identity credentials, such as passports, identity cards, or driver licenses. The stakeholder must verify these credentials. This is a design criteria of the stakeholder-oriented architecture that
 30 provide trust to service providers who can be assured that users who are endorsed by the stakeholders are real and having certain credible customer profile.

Since the stakeholder would have reliable information and identity of its groups of users, the stakeholder would carry out mass registration of services to the

groups of the users through the user management system **41**. For the local service layer **20** (not shown), the group registration can be done at each local master **21**, where the user account may be created, and the registration information can be uploaded to the user management system **41** of the gate master **11** for authentication and authorization. Registered user profiles can also be uploaded to or mirrored by the gate master **11**, and can be analyzed and summarized. The stake master server may generate the statistical profiles of users by monitoring and capturing tendencies or traits of interests and / or behaviors of the users. The registered and statistical user profiles of an individual user will be retained with the respective local master **21** for privacy protection. The statistical user profiles collected by various stake master servers and the registered user profiles can be used to provide targeted and effective marketing services to users, such as pull and push marketing of services.

For pull marketing (or user-centric marketing), users will be able to select services from targeted services provided by different stakeholders and service providers through a list of master services generated at the gate master **11**, local master **21** or home master **31**. The list of master services is based on the participating stakeholders' profiles in the stakeholder proprietary data **69** (not shown) of the database **45**, which is managed by the corresponding stake master server. The targeted services are dynamically generated by different stakeholders based on the statistical user profiles. For users who consent with push marketing, targeted (or relevant to user's traits in interest) promotional materials can be selected based on the statistical and registered user profiles (automatically by the gate master **11**, local master **21** or home master **31**). These marketing materials are sent to the users accordingly via personal information management means such as e-mail, Short Message Service (or SMS), notices, etc.

Figure **3** illustrates a stakeholder-oriented architecture of the preferred embodiment of the present invention. The gate master **11** forms a gate network **14** at the gate service layer **10** with other gate masters **11** in the system **5**. The gate service layer **10** may be the high-speed backbone of the network, which is crucial to enable fast inter-trunk access or communication to other gate masters **11**. The communication among the gate masters **11** may take place over Hyper Text Transport Protocol (or HTTP) and/or Hyper Text Transport Protocol over Secure Socket Layer (Or HTTPS) for integrating services by the service integration **42** (not shown) and

organizing resources by the resource organizer **43** (not shown) at the level of the gate service layer **10**. Each gate master **11** in the gate service layer **10** provides an entry point to the different layers of stake master servers for network support and management. The gate master **11** also integrates services provided by gateway
 5 service providers through the gate service layer **10**.

The local master **21** forms a communication network (or local network **24**) at the local service layer **20** with other local masters **21** in the system **5**, integrating stakeholder services. The communication among the local masters **21** may take place over Simple Object Access Protocol (or SOAP), Extensible Markup Language (or
 10 XML) / Extensible Stylesheet Language Transformation (or XSLT) and/or Web Service Description Language (or WSDL) as a part of service integration **42** and resource organizer **43** at the level of local service layer **20**. The distinct communication network link **15** may be established between the gate master **11** and the local master **21** for vertical service integration, facilitating the gate master **11** and /
 15 or the local master **21** for integrating services available through the gate master **11** and through the local master **21**.

The home master **31** establishes a home network **34** with the home devices **32** in the system **5**, integrating personal information at home service layer **30**. The communication between home master **31** and home devices **32** may take place over
 20 IEEE 802.11, Bluetooth, and/or IEEE 1394 as a part of service integration **42** and resource organizer **43** at the level of home service layer **30**. The distinct network communication link may be established between the local master **21** and the home master **31** for vertical service integration, facilitating the local master **21** and the home master **31** for integrating services available via the local master **21** and through the
 25 home master **31**.

Figure 4 illustrates an example of a gate service layer **10** of gate stakeholder of the preferred embodiment of the present invention. In this example, one of gate masters **11** is connected through the network from the network access server **8**. The gate master **11** is also connected through gate network **14** to other gate masters **11**.
 30 Those gate masters **11** may additionally provide services, such as a mail server, weather forecast service server, hardware supplier, software supplier, multimedia content provider, voice over IP gatekeeper, and / or bulletin board server. The gate network **14** facilitates the gate masters **11** for horizontal service integration, enabling

each of the gate masters **11** to integrate services available through other gate masters **11** in the gate network **14**.

Figure **5** illustrates an example of a local service layer **20** of local stakeholder of the preferred embodiment of the present invention. In this example, a local master **21** is connected to a local network **24** comprising other local masters **21** providing various services, such as stakeholder enterprise services including enterprise resource management (ERM), client relation management (CRM) and public relation, services from local service provider including e-commerce, stakeholder local services including notices and opinion polls, and accountings. These services are integrated and made available through the local master **21**. In other word, the local network **24** facilitates the local masters **21** to integrate services horizontally, enabling each of the local masters **21** to integrate services available through other local masters **21** in the local network **24**.

Figure **6** illustrates an example of a home service layer **30** of home stakeholder of the preferred embodiment of the present invention. In this example, the home master **31** is connected to a home service network **34** for personal information management. The home service network **34** comprises various home devices **32**, including personal computers or computing devices, communal aerial broadcast distribution (CABD) system, home network appliances and audio visual (A/V) equipments, and private automatic branch exchanges (PABX). The home master **31** provides means for integrating service (service integration **42** (not shown)) and for organizing the service resources (resource organizer **43** (not shown)).

Figure **7** illustrates an overall system component schematic diagram of the preferred embodiment of the present invention. A client browser **1** is accessing the system **5** through the gate master **11**. A firewall **6** provides a first line of security over the system **5**. The gate master **11** comprises an access control **102** as the user management system **41** (not shown), web server **103**, peer-to-peer (P2P) file sharing **104** and service bus interface generation engine **101** as service integration **42** (not shown) and resource organization **43** (not shown), database **100** as the database **45** (not shown), and, DHCP server **105** and DNS **106** as the network management **44** (not shown). Gate network **14** is connected through the gate master **11**. The service bus interface **80** (not shown) is a unified graphical user interface or portal dynamically generated by a stake master server, i.e. the gate master **11**, local master **21** or home

master **31**. The service bus interface **80** is segregated into multiple service areas, with each administered by a stakeholder. Each stakeholder could customize the contents on the designated service area to provide access to data that are user-centric to the users. The customized contents are stored in each stake master server and can be
 5 changed or updated by the respective stakeholder.

A local master **21** is connected to the gate master **11** over a communication network link **15**, i.e. virtual private network for segregating it from other local masters **21**. The local master **21** comprises database **200**, service bus interface generation engine **201**, access control **202**, web server **203**, P2P file sharing **204** and DHCP
 10 server **205**. Local network **24** may be accessed through the local master **21**. When the user is accessing services at the local service layer through the browser **1** outside the system **5**, the service request may be redirected from the gate master **11** to the local master **21**, so that the local master **21** would be hosting the user, and be generating the service bus interface **210**. Note that the local master **21** works as a
 15 gateway for accessing to the home master **31** below in the system **5**.

A home master **31** is connected with the local master **21** over another communication network link **25**, i.e. virtual local area network for segregating it from other home masters **31**. The home master **31** comprises a network address translator (or NAT) **7**, database **300**, service bus interface generation engine **301**, access control
 20 **302**, web server **303**, P2P file sharing **304**, and DHCP server **305**. Home network **34** may be accessed through the home master **31**, where the home master **31** works as a gateway to the home network **24**. Optionally, the home master **31** and the home devices **32** support Universal Plug & Play (or UPnP) feature to ensure end-to-end communication from a home device **32** connected there under. It is further optional
 25 that the home master **31** may support device control protocol for implementing UPnP.

Each user who wants to gain an access to a hierarchical layer is authenticated by the stake master server of the layer. For example, assuming if the user is accessing the system **5** from outside through the user browser **1**, the user browser **1**, first, establishes a VPN (or SSL) connection via NAS **8** (not shown) with the gate master
 30 **11**. The user, then, submits his or her username and password through the gate page **400** of the service bus interface **110** (not shown) generated by the service bus generation engine **101** of the gate master **11**. Based on the authentication by the access control **102** and user attributes **61** in the database **100** at the gate master **11**, the

gate master **11** identifies a corresponding stake master server to which the user belongs. If the user is registered with the gate master **11** and does not belongs to any local master **21** or home master **31**, the service bus interface generation engine **101** of the gate master **11** will generate the gate navigation page **401G** (not shown) of the service bus interface **110**. The gate navigation page **401G** of the service bus interface **110** would provide access to web contents provided by the gate service layer **10** through the gate master **11**. If the user belongs to a local master **21**, the request is redirected to the corresponding local master **21**. The local master **21** would look up the corresponding user attributes **61** in the database **200** at the local master **21** to determine whether the request comes from a registered user at the local master **21**, who does not have a home master **31**. If affirmative, and once the access control **202** of the local master **21** authenticates the user, the service bus interface generation engine **201** of the local master **21** would generate the local navigation page **401L** (not shown) of the service bus interface **210** (not shown) of the local master **21**. If the user has registered with a home master **31**, then the request is further redirected to the corresponding home server **31**. The dynamically assigned IP address of the home master **31** has to be resolved by the dynamic domain name server **206** of the local master **21**, since DHCP server **205** of the local mater **21** dynamically assigns IP addresses to the home masters **31**. The access control **302** of the home master **31** would then authenticate the user and its service bus interface generation engine **301** generates the home navigation page **401H** (not shown) of the service bus interface **310** (not shown).

Alternatively, the user's request may be forwarded with his/her username and password to an appropriate corresponding stake master server. Then, the user browser **1** may be redirected to the hosting stake master server accordingly with user attribute directory **61** of the corresponding database **100**, **200** or **300** at the corresponding stake master server, namely the gate master **11**, local master **21** or home master **31**.

Figure **8** illustrates a structure of the database **45** of the preferred embodiment of the present invention. Note that the database **45** is the fundamental design template or pattern for all the databases at all the stake master servers. Namely, the database **100** for the gate master **11**, database **200** for the local master **21** and the database **300** for the home master **31** are structured and organized in the same way as the database **45**. The database **45** comprises a plurality of fields for storing the information related

to user management system **41**, service integration **42**, resource organizer **43** and network management **44**. The database **45** maintains user credentials **60**, user attributes directory **61** and E-certificate Register **62** for user management system **41**.

User credentials **60** includes, but not limited to, the information for validating
 5 credential of the user, such as user identification, gender, first name and last name of the user, e-mail address, home phone number, mobile phone number, mailing address, user name, password, user authorization level, user home master hostname, etc. These information are validated by the stakeholder based on the user's proof of identity, including, but not limited to, passport, identification card, drivers license, or
 10 likewise. It may also maintain user signature in digital or hand-written format for authentication and validation of the user. Optionally, the user credentials **60** may maintains time of creation for keeping track of when the entry for the user is created, and time of modification for keeping track of when the entry for the user is modified last.

15 User attribute directory **61** includes information regarding which group the user belongs to, what services the user subscribes, which interest group the user belongs to, etc, for service providers to decide whether to provide or to grant access to particular resources in the system **5**. User attribute directory **61** may optionally be updated automatically by the user management system **41** by monitoring the user's
 20 traits or behaviors through the browser **1**. Surveyed information may be used for refining the marketing strategy for a stakeholder, improving the service by a service provider, etc.

E-certificate register **62** maintains and keeps track of E-certificate for each user of the system **5**. This is used for validating and certificating the identity of the
 25 user upon request for providing another level of security to the user community in the system **5**. E-certificate may be used as in a Public Key Infrastructure with a Certificate Authority.

System configuration **63** maintains system preference, configuration parameters and other data for deciding the role and operational behavior of the stake
 30 master server.

System mirror image **64** comprises a plurality of partitions or compartments for storing plurality of system mirror images, including system related data such as

system configuration **63** and stakeholder proprietary data **69**, for managing and maintaining various versions of system images.

For the service integration **42**, the database **45** maintains application programs **65**, resource directory **66**, service repository **67**, application portlets **68**, stakeholder
5 proprietary data **69**, data warehouse **70** and template **71**.

Application programs **65** store a collection of service task-oriented programs for providing controller functions to collate data and various services available at the serving layer of the system **5**. The application programs **65** also include a library of subprograms, such as a collection of Java servlets. Each server application program,
10 if required, would initiate communication with the other masters on the same layer to carry out information exchanges and request certain tasks at the other masters. Depending on the serving level, data exchange may be carried out through P2P file sharing **104**, **204** or **304**.

Resource directory **66** is a collection of Uniform Resource Identifiers (or
15 URIs) of service providers that are collected by the gate master **11** or/and the local master **21**. The resources (such as URI) are grouped under sequential layers by services, categories, and types. These resources are accessible from the service bus interface **80** and can be selected by users to form a customized listing of portal resources for access by the users. Each stakeholder can also add or delete resources
20 from his/her own service repository. These resources can be generated dynamically and integrated by the gate master **11**, local master **21** and/or home master **31**.

Service repository **67** is a library collection of services that have been agreed and provided through the gate master **11** and the local master **21** to the users. These services are organized and identified by corresponding metadata, which include
25 descriptions of the services, vendors, cities where services are available, language support, service coverage area, uniform resource identifier, etc. The services are accessible by the user. The user may select a set of particular services by editing or personalizing his or her service bus interface **80**. Each of the services is identified by a uniform resource identifier (or URI), which may be linked to a series of application
30 portlets for the service bus interface **80**. The service repository **67** integrates services resides at a particular stakeholder service layer.

Application portlets **68** is a collection of portlets defining portions or sub-frames of portal displayable page, or service bus interface that may dynamically be generated, and may work in conjunction with application programs **65**, stakeholder proprietary data **69**, data warehouse **70** and template **71**. The size of portlet would
 5 vary depending on the size of the display with the browser **1** by automatically detecting or by specifying the display size required.

Stakeholder proprietary data **69** includes stakeholder profiles and preferences, stakeholder marketing data, statistical data, policies, rules and agreements governing data transfer among the system **5**. The policies may include data sharing policy,
 10 security policy, user policy, attributes acceptance policy, and attribute sharing policy that each stakeholder would use to set rules that would dictate the methodology and extent of data exchange within the portal system. In the preferred embodiment of the present invention, these policies may be implemented within the operation of an authentication and authorization infrastructure in the similar ways as Shibboleth™
 15 manages. The stakeholder proprietary data **69** is private to the stakeholder, especially stakeholder profiles and preferences, stakeholder marketing data, and statistical data that can be used for generating service bus interface **80**. It is noted that the stakeholder proprietary data **69** would not be shared with other stakeholders.

Data warehouse **70** stores multimedia files in various formats, transformed
 20 data to accommodate particular requirements for the browser **1** or home devices **32** (i.e. display size, available throughput or bandwidth, available decoding scheme, etc), and/or data extracted by data mining feature via P2P file sharings **104**, **204** and **304**. These data are presented to the user through the service bus interface **80**, and may be tagged and formatted in Extensible Markup Language (or XML) for better
 25 presentation manipulations by a stake master or browser **1**.

Templates **71** include shells, containers, forms and templates of displayable pages for generating service interface bus dynamically. Service Bus Interface Generation Engine **101**, **201** or **301**, depending on the serving layer, uses and renders templates and frames by integrating it with application programs **65** and / or
 30 application portlets **68** accordingly to the user profile / stakeholder profiles.

Figure **9** illustrates a block diagram of an access control **50** of the user management system **41** in the preferred embodiment of the present invention. The

access control **50** comprises three fundamental features, namely authentication **51**, authorization **52** and registration **53**.

Authentication **51** authenticates the user based on supplied user identification and password for verifying whether the user has a proper level of privilege for
 5 accessing the requested stake master server and its serving layer based on the information stored in the user credentials **60** (not shown).

Authorization **52** authorizes the user privilege for accessing a set of server applications, services, data and other servers in its serving layer based on the information in user attribute directory **61** (not shown) of the database **45** (not shown).

10 Registration **53** is for an administrator or stakeholder of a serving layer to register user to the serving layer, user group, and level of privilege or authorization to the serving layer. The registered information, including but not limited to user credentials, user attributes and electronic certificates provided by the users, will be stored in user credentials **60**, user attributes directory **61** and E-certificate register **63**
 15 (not shown). The registration information shall be propagated and shared (or synchronized) with other stake master servers through P2P file sharings **104** (not shown), **204** (not shown) and **304** (not shown) based on servicing policy mutually agreed among stakeholders within the system.

Figure **10** illustrates a block diagram of a data sharing mechanism over P2P
 20 file sharings **104**, **204** and **304** in the preferred embodiment of the present invention. The gate master **11**, local master **21** and home master **31** shares data over the communication network through P2P file sharing **104**, **204** and **304**. Data mining and data extracting feature may be realized in conjunction with P2P file sharing **104**, **204** and **304** at the stake master servers, namely gate master **11**, local master **21** and home
 25 master **31**, respectively, so that any information in databases **100**, **200** and **300** can be shared among the stake master servers. It is noted that, in the preferred embodiment of the present invention, with VPN connection (or the communication network link **15**) between the gate master **11** and local master **21**, and VLAN connection (or communication network link **25**) between the local master **21** and home master **31**, the
 30 gate master **11**, the local master **21** and home master **31** are under one virtually private network domain that enables the stake master servers to share data freely. The service bus interface generation engine **101**, **201** and **301** may use the similar scheme for

accessing the local database or remote database over P2P file sharings **104**, **204** and **304**.

For example, the data sharing mechanism shown in Figure **10** can be used for propagating the user registration information from one stake master server to the other masters. User registration by an administrator at the gate master **11**, the registration shall be done through the access control **102** (not shown) from the administrator's browser **1** (not shown). Once authentication and authorization of the administrator are confirmed through access control **102**, the administrator enters the user's registration information through the browser **1**, including the user credentials **60** (not shown), user attributes directory **61** (not shown) and E-certificate register **62** (not shown). In similar manner, an administrator at the local master **21** does user registration through the local master **21**. Moreover, an administrator at the home master **31** does the user registration through the home master **31**. Once the user registration to its own master is completed, the registration information will be shared to the other masters. For example, once the registration is completed at the gate master **11**, the user registration information is propagated through from P2P file sharing **104** to P2P file sharing **204** and P2P file sharing **304** of the local master **21** and the home master **31**, respectively. Once the local master **21** and the home master **31** receive the registration information, it updates corresponding user credential **60**, user attributes directory **61** and E-certificate **62** of the databases **200** and **300**. Optionally, this propagation or synchronization of user registration information may take place to only stake master servers associated with the user, i.e. the gate master **11**, the local master **21** and home master **31** to which the user belongs. The propagation of user registration information enables each stake master server to redirect user's request to appropriate stake master server, when the user accesses at a different stake master server.

Figure **11** illustrates a block diagram for a P2P distribution of system mirror image **64** in the preferred embodiment of the present invention. One of local masters **21-1** initiates a communication with the gate master **11** for checking whether new system mirror image is available. The same can be initiated by a home master **31**. Once the local master **21-1** detects a newer system mirror image at the gate server **11**, the local master **21-1** initiates to download the latest version of the system mirror image and receives the addresses of the other local masters that would share the latest

updating file from the gate master **11**.

The gate master **11** starts to transfer some parts of the system mirror image to the local master **21-1** and provides the local master **21-1** with a list of other local masters, namely **21-2** and **21-3**, that the local master **21-1** would need to distribute the system mirror image to. Note that the local master **21** has the database **200** partitioned in a plurality of sections for storing the system mirror images. The local master **21** stores the new system mirror image in a different partition than the one storing the currently used system mirror image. The local master **21-1** starts transferring the same parts of the system mirror image that it just received from gate master **11** to the other local masters **21-2** and **21-3**. Likewise, the local masters **21-2** and **21-3** store the new system mirror image in the different partition from the one storing the currently used system mirror image. Upon completion of the file sharing, the local masters **21-1**, **21-2** and **21-3** switch to operate the system from the newly stored system mirror image. Figure **12** illustrates a frame structure of a service bus interface **80** for integrating resource access of the preferred embodiment of the present invention. The service bus interface **80** consists of a plurality of segregated fixed areas or frames, namely frame **1 81**, frame **2 82**, frame **3 83**, frame **4 84**, frame **5 85**, frame **6 86**, frame **7 87**, frame **8 88**, and frame **9 89**, predefined for integration of applications and various services provided by the stakeholders associated to the user. In other words, these applications and services are provided through the associated ones of the gate masters **11**, the local masters **21** and home masters **31** which are associated with the user based on the user profile and stakeholder profile. Each frame has a standardized display size to accommodate a frame-page. Each frame area can be further subdivided into smaller frame areas as required. In other words, each frame may comprise a plurality of sub-frames. Each of the sub-frames bears a corresponding uniform resource identifier (URI). URI includes user selected URI or/and stakeholder selected URI. The user selecting one of sub-frames in one of frames would cause the frame that contains selected sub-frame to be refreshed and to bear a new set of sub-frames. Each frame has a corresponding portlet from application portlets **68** (not shown) for dynamically generating content for the frame, and may utilize information from data warehouse **70**, templates **71** and application programs **65**. The portlet may exchange specific data within the network for displaying appropriate information. The service bus interface **80**, concerted with

these multi frames, may activate a certain service synchronously or asynchronously through icons to accomplish the stakeholder-servicing goal.

The service bus interface **80** provides a coherent multi-frame navigation to web services from a list of filtered or selected web sites, and would fit into the full
 5 screen of a display on a computing device, such as computer monitor through the browser **1**. Navigational clicks, in general, will not be more than three clicks away from functional or application services. In other words, the user will be navigated to a particular web service by selecting no more than three URIs (such as hyper links) or frames provided through the service bus interface **80**.

10 Each frame of the service bus interface **80** is individually refreshed during the navigational process, i.e. only smaller frames may be refreshed to provide an interactive follow-me type of further navigation. This method would reduce refreshing time and amount of traffic on the network comparing it with full-page refresh, and would provide a stable and faster navigation environment. Since each
 15 frame of the service bus interface **80** is individually processed, it can handle multiple web service requests at the same time. For example, one of the frames may display a streaming video while the user is browsing through other URLs on the other frame.

Figure **13** illustrates a conceptual view of generation of customized service bus interfaces **110**, **210** and **310** for each stakeholder level in the preferred
 20 embodiment of the present invention. Each of the service bus interfaces **110**, **210** and **310** comprises a plurality of displayable pages. At the gate level **120**, while the gate master **11** (not shown) is hosting the user browser **1** (not shown), the service bus interface generation engine **101** (not shown) of the gate master **11** (not shown) generates a service bus interface **110**, which comprises a gate page **400**, a gate
 25 navigation page **401G** and a framed header and footer page **402G**.

At the local level **220**, the service bus interface generation engine **201** (not shown) of the local master **21** (not shown) generates a service bus interface **210**, which comprises the gate page **400** forwarded by the gate master **11**, a local
 30 navigation page **401L** and a framed header and footer page **402L**. The local navigation page **401L** has a frame area that is dynamically generated by the service bus interface generation engine **201** of the local master **21** for providing accesses to integrated local services. During the integration, resources of the service repository

67 (not shown) stored at the local master 21 provided by the stakeholders at local service layer 20 are supplemented by the resources of the service repository 67 (not shown) stored at the local master 21 of the stakeholders at the gate service layer 20. Supplemental data may be transferred through from P2P file sharing 104 to P2P file sharing 204. The framed header and footer page 402L comprises a header frame with a plurality of icons for returning to the navigation page 401L and a plurality of icons to pursue different categories of services as listed in the navigation page 401L. The framed header and footer page 402L further comprises a footer frame, which consists of a plurality of icons of home links 533 and home control categories 534. The body of the header and footer page 402L bears the same function as the share service frame 532 but has a much bigger area for displaying various interactive services provided by all stakeholders.

Similarly, at the home level 320, the service bus interface generation engine 301 (not shown) of the home master 31 (not shown) would generate a service bus interface 310 that comprises the gate page 400 forwarded by the gate master 11, a home navigation page 401H and a framed header and footer page 402H. The home navigation page 401H of the service bus interface 310 by home master 31 has a specific areas, namely home links 533 (not shown) and home control categories 534 (not shown) that are customized by the home stakeholder, and generated by the service bus interface generation engine 301 of the home master 31. The service repository 67 (not shown) stored at the home master 31 can be edited and customized by the home stakeholder or home users by editing and / or selecting the services from the service repository 67 (not shown) at the gate master 11. The resources selected from the service repository 67 of the gate master 11 may be listed as home links 533, and categorized under one of the local service categories 531 (not shown).

Figure 14 illustrates an intuitive layout of gate page 400 for smooth data access and exchange in the preferred embodiment of the present invention. The gate master 11 (not shown) collects various customizations at each serving layer level and stores mirror images of the services at various master levels to generate a unified access to interoperable links with other stake master servers for retrieval and processing of specific portlet frames from the respective stake master server. The gate page 400 is a page for retrieving information for or providing services available through the gate masters 11 quickly to the user. The gate page 400 also provides a

user login and look-ups of useful information from the system **5**. The gate page **400** has a unique interface to reflect services particular to the geographical location that the user resides, corresponding to the location frames, such as location 1 **500**, location 2 **501**, location 3 **502**, and local **503**. For example, the local master **21** (not shown) that the user belongs to may supply information required for the frame, local **503**. The gate page **400** further comprises a single text box **508** for input queries for different search engine choices indicated in search 1 **509**, search 2 **510**, search 3 **511** and search 4 **512**, such as, Yahoo! [®], Google [®], dictionary, and yellow pages. Access to quick links, Quick 1 **515**, Quick 2 **516**, Quick 3 **517**, and Quick 4 **518** may be provided appropriately. Access to web mail is also provided on this gate page **400**. After the user inputting his or her login information by entering his/her identification in the user name **513** and the password in the password **514** and being authenticated, the user can select the screen size of the display to fit into the screen size of the terminal device deployed by the user by selecting size 1 **504**, size 2 **505**, size 3 **506** or size 4 **507**. The multi-frame architecture of the gate page **400** will be dynamically reorganized by the gate master **11** to fit into a new sequential flow of multi-frame navigation on the navigation page based on the size of the display of the terminal device using a frame tailoring.

The frame tailoring is the process proceeded by the gate master **11**. When the user requests for gate page **400** to the gate master **11**, the gate master **11** automatically detects the display resolution of the browser **1** (not shown) of the terminal device. Based on the resolution, the gate master **11** then searches and selects appropriate portlets and templates in the application portlet **68** (not shown) and template **71** (not shown). The gate master **11** forwards the selected portlets and template to data warehouse **70** (not shown) for generating the frame page(s) to fit with the detected resolution of the display. Then, the gate master **11** sends back the frame page to the browser **1** for display.

Figure **15** illustrates a common area of the home navigation page **401H** for home control and transaction processing frame in the preferred embodiment of the present invention. The home navigation page **401H** is generated dynamically by the service bus interface generation engine **301** of the home master **31** (not shown), and comprises a plurality of frames, including a frame for gate service applications **530** locating at the top of the home navigation page **401H**. Below the gate service

application frame **530**, the home navigation page **401H** comprises a frame for local service category **531**, listing up a plurality of local service category selections for the user to chose from, and a frame for a share service frame **532**, displaying available services in the selected local service category through the local service category **531**.

5 A home links frame **533** and a home control category frame **534** are situated at the bottom of the home navigation page **401H**. The home links frame **533** comprises a plurality of URL links associated with personal or home use in general. Dereferencing or following a URL link in the home links frame **533** will lead to another dynamically generated frame pages for providing access to other home
10 services on the share service frame **532** or in the framed header and footer page **402H** (not shown). Optionally, the service bus interface generation engine **301** of the home master **31** may dynamically generate a new pop-up window for providing accesses to the aforementioned services.

The home control category frame **534** comprises a number of categories and
15 listing for home controls or control methods associated with home devices **32** (not shown). Dereferencing or following one of the home control category within the home control category frame **534** will cause the service bus interface generation engine **301** of the home master **31** to dynamically generate a share service frame **532** with the selected category of services depicted on the share service frame **532**. The
20 share service frame **532** is a common frame to display interactive processing of web services provided by all stakeholders. The dynamically generated share service frame **532** has further navigation links and / or icons for providing interactive steps to display further frames on the share service frame **532** until the service has been consumed by the user or rendered by the service provider.

25 Figure **16** illustrates a conceptual view of service categories **550** of resources based on interest of a targeted home user in the preferred embodiment of the present invention. Each stakeholder would set a policy on a type or types of services to be provided to its coherent user group, and the information is stored and managed in the stakeholder proprietary data **69** (not shown) of the database **45** (not shown). The
30 service categories **550** are dynamically generated, in this case by the service bus interface generation engine **301** of the home master **31** (not shown), as part of the service bus interface **80** (not shown) of the stake master server. The service categories **550** would work in conjunctions with other stake master servers for

retrieval and processing of specific portlet frames that belong to other stake master servers. This is to be noted that the gate master **11** and the local master **21** also possess the same capability for generating the service categories **550** dynamically as a part of the service bus interface **80**.

5 Portal contents are categorized according to contributions by various levels of stake master servers. Each stakeholder is able to customize contents contributed by its level of stake master server by categories. The contents are communicated with the users through the service bus interface **80**.

10 Services **600** are classified into four services, namely gate services **601**, local services **602**, home services **603** and other services **604**. Each of services **600** is broken down to a plurality of categories **610**; each of categories **610** are further broken down to types **620**. Finally, each of the types **620** is divided to resources **630**. In this example, gate services **601** comprise one of categories **610**, weather **611**, and then weather **611** is categorized into local weather **621** and international weather **622**
15 for types **620**. Both local weather **621** and international weather **622** are further categorized to current weather **631** and weather forecast **632** at resources **630**. For the local services **602**, it comprises communications **612** for the categories **610**; then the communications **612** is divided to Voice over IP (or VoIP) **623** and e-mail **624** as the types **620**. For VoIP **623** types, it is further categorized to local call **633** and
20 international direct dialing call as the resources **630**. For the home services **603**, it comprises a category of entertainment **613**. For the other services **604**, it comprises time and date **614**. For entertainment categories **613**, it is divided to TV **625** and DVD **626** for the types **620**, and for time and date categories **614**, it is divided to local date and time **627** and date and time of an international city **628** for the types **620**.

25 Figure **17** illustrates a block diagram for compilation of service repository process by data extraction and data transformation in the preferred embodiment of the present invention. A service provider from a local service layer **20** (not shown) transmits service data or information from the local master **21** through the communication network link **15** to the gate master **11**. The service data is stored in
30 service repository **67** in the database **200** on the local master **21**, and transmitted from the web server **203** or P2P file sharing **204**, via the communication network link **15**, to the corresponding web server **103** or P2P file sharing **104**, respectively, at the gate master **11**. The service data may be transmitted using SOAP / XML as a data

exchanging and communication protocol between the web server **103** of the gate master **11** and the web server **203** of the local master **21**. Short Message Service (SMS) or e-mail may be used for data exchange between P2P file sharing **104** and P2P file sharing **204**. Once the gate master **11** receives the service data, then, the gate master **11** stores the data in the data warehouse **70** in the database **100** on the gate master **11**. Then, the gate master **11** transforms the data using XML style language, or data formatting / styling rules, and combines the transformed data with web designed forms or/and templates for generating a series of application frame pages, which to be stored in the database **100**. The gate master **11**, then, add metadata to the forms or/and templates to form application frame page series as usable URLs, and stores the frame pages in the service repository **67** of the database **100** on the gate master **11**. When the web server **203** of the local master **21** requests frame page files to the web server **103** of the gate master **11** for displaying service bus interface **210**, the gate master **11** forwards the pages to the local master **21** for caching the page for display on the user browser **1** (not shown). From this perspective, the web server **203** may act as a proxy server for the web server **103** of the gate master **11**. The web server **203** may also directly request portlets from the application portlet warehouse **68** of the database **100** on the gate server **11**.

Figure **18-a** illustrates a block diagram identifying features utilized for updating of gate service bus interface **101** and local service bus interface **201** through a staging server **700** in the gate service layer **10** (not shown) in the preferred embodiment of the present invention. An administrator at gate service layer **10** or local service layer **20** (not shown) accesses the staging server **700**, on which a service bus interface **110** for the gate master **11** or service bus interface **210** for the local master **21** has been tested and verified. The administrator provides his or her user identification and password to the access control **702** of the staging server **700**. The administrator may add or delete services through the browser **1** by alternating contents in the service repository **67** and/or resource directory **71** of the database **710** on the staging server **700**. The final contents are distributed to the gate master **11**, the local master **21**, and/or the home master **31** through P2P file sharing **704**. For example, the service bus interface **110** of the gate master **11** would be distributed from the staging server **700** through P2P file sharing **704**, over the communication network, through P2P file sharing **104** of the gate master **11** and P2P file sharing **204** of the local master

21 for updating service repository 67 and resource directory 66 of the database 100 on the gate master 11 and service repository 67 and resource directory 66 of the database 200 on the local master 21, respectively. The service bus interface 210 for the local master 21 would be distributed only to the local masters 21, from the service repository 67 and resource directory 66 of the database 710 on the staging server 700 through P2P file sharing 704 over the communication network through P2P file sharing 204 of the local master 21 to the service repository 67 and resource directory 66 of the database 200 on the local master 21. System mirror image may be distributed in the similar way as well, i.e. a system mirror image from the system mirror image 64 in the database 710 may be distributed through P2P file sharing 704 over the communication network through P2P file sharing 104 of the gate master 11, P2P file sharing 204 of the local master 21, and P2P file sharing 304 of the home master 31 to the system mirror image 64 of the databases 100, 200 and 300 on the gate master 11, local master 21 and home master 31, respectively.

Figure 18-b illustrates a block diagram identifying features utilized for updating of home service bus interface 301 in the preferred embodiment of the present invention. An administrator at home service layer 30 accesses the home master 31 through the browser 1 via the web server 303 for updating the home master service bus interface 301. The home master 31 authenticates the administrator based on the administrator's identification and password supplied by the administrator at the access control 302. Once the administrator is authenticated, the administrator may add or delete services by alternating the contents in the resources directory 66 and service repository 67. Once the services are finalized, the system mirror image will be stored in the system mirror image 64 of the database 300 on the home master 31.

It is to be understood that the embodiments and variations shown and described herein are merely illustrations of the principles of this invention and that various modifications may be implemented by those skilled in the art without departing from the spirit and scope of the invention.

**THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:**

1. A system for dynamically generating a user-centric portal in a hieratically layered and distributed network, comprising:

- (i) a network access server, aggregating a plurality of first stake master servers;
- (ii) each of said plurality of said first stake master servers aggregating a plurality of second stake master servers establishing first communication network links therewith;
- (iii) each of said plurality of said second stake master servers aggregating a plurality of third stake master servers establishing second communication network links therewith;
- (iv) each of said plurality of said third stake master servers aggregating a plurality of home devices for forming home networks;

wherein said first, said second, and said third stake master servers are servers of web services, comprising user management system, service integration engine, resource organizer, network management system and database; and

wherein one of said first, said second and said third stake master servers first receives a request for said user-centric portal for a user directly or through said network access server from a browser with a user identification and password, said request is redirected to a corresponding one of said first, said second and said third stake master servers based on profile of said user stored in said database of said stake master server first received said request, said user management system of said corresponding stake master server authenticating said user based on said profile of said user stored in said database of said corresponding stake master server, and said corresponding stake master server dynamically generates said user-centric portal by integrating services from associated ones of said first, said second and said third stake master servers based on said profile of said user and profiles of stakeholders associated with said user.

2. The system as recited in claim 1, wherein said plurality of said first stake master servers form a first service network layer over a first communication network, said plurality of said second stake master servers form a second service network layer over a second communication network, and said plurality of said third stake master servers form a third service network layer over a third communication network.

3. The system as recited in claim 2, wherein said first communication network is established over at least one of Hyper Text Transfer Protocol and Hyper Text Transfer Protocol over Secure Socket Layer for integrating said services among said first stake master servers by said service integration engines of said first stake master servers.

4. The system as recited in claim 2, wherein said second communication network is for integrating said services among said second stake master servers by said service integration engines of said second stake master servers, and is established over at least one of Simple Object Access Protocol, Extended Markup Language / Extensible Stylesheet Language Transformations and Web Services Description Language.

5. The system as recited in claim 2, wherein said third communication network is for integrating said services among said third stake master servers by said service integration engines of said third stake master servers, and is established over at least one of IEEE 802.11, Bluetooth and IEEE 1394.

6. The system as recited in claim 2, wherein said second service network layer comprises a plurality of sub-layers.

7. The system as recited in claim 1, wherein each of said stake master servers are controlled by each of said stakeholders.

8. The system as recited in claim 7, wherein said stakeholder is a person or legal entity that has interests or stakes in said system.

9. The system as recited in claim 1, wherein said first communication network links segregate said second stake master servers aggregated by said first servers physically, virtually or physically and virtually.

10. The system as recited in claim 9, wherein said first communication network links segregates said second stake master servers virtually by virtual private network.

11. The system as recited in claim 9, wherein each of said first communication network links facilitates said first and said second stake master servers to integrate said services available through said first and said second stake master servers.

12. The system as recited in claim 1, wherein said second communication network links segregate said third stake master servers aggregated by said second servers physically, virtually or physically and virtually.

13. The system as recited in claim 12, wherein said second communication network links segregates said third stake master servers virtually by virtual local area network.

14. The system as recited in claim 12, wherein each of said second communication links facilitates said second and said third stake master servers to integrate said services available through said second and said third stake master servers.

15. The system as recited in claim 1, wherein said portal comprises a plurality of pages.
16. The system as recited in claim 15, wherein said portal is resized manually by said user selecting a plurality of predetermined display sizes of said browser.
17. The system as recited in claim 15, wherein said portal is automatically resized by said resource organizer automatically detecting display size of said browser.
18. The system as recited in claim 15, wherein said plurality of pages comprise a gate page, a navigation page and a framed header and footer page.
19. The system as recited in claim 18, wherein said gate page comprises areas for said user to enter a user name and password.
20. The system as recited in claim 19, wherein said gate page further comprises a plurality of frames for providing web services available through said first stake master servers and for services particular to a geographical location that said user resides.
21. The system as recited in claim 20, wherein each of said plurality of said frames further comprises a plurality of sub-frames, wherein each of said plurality of said sub-frames bearing Uniform Resource Identifier.
22. The system as recited in claim 21, wherein said user selecting one of said plurality of said sub-frames in one of said plurality of said frames causes said one of said plurality of said frames to refresh for bearing another plurality of said sub-frames.

23. The system as recited in claim 22, wherein said user is navigated to one of said services by selecting any of said plurality of said sub-frames in one of said plurality of said frames within three times.

24. The system as recited in claim 18, wherein said navigation page comprises a plurality of frames for providing web services available through said corresponding stake master server.

25. The system as recited in claim 24, wherein each of said plurality of said frames further comprises a plurality of sub-frames, wherein each of said plurality of said sub-frames bearing Uniform Resource Identifier.

26. The system as recited in claim 25, wherein said user selecting one of said plurality of said sub-frames in one of said plurality of said frames causes said one of said plurality of said frames to refresh for bearing another plurality of said sub-frames.

27. The system as recited in claim 26, wherein said user is navigated to one of said services by selecting any of said plurality of said sub-frames in one of said plurality of said frames within three times.

28. The system as recited in claim 1, wherein said network management system comprises dynamic host configuration protocol server and dynamic domain name server.

29. The system as recited in claim 1, wherein said user management system comprises functions of user authentication, user authorization and user registration.

30. The system as recited in claim 1, wherein said database comprises a plurality of fields for managing said user profile for said user management, wherein said plurality of fields comprise:

- (i) user credentials for managing credential information for said users;
- (ii) user attribute directory for managing attribute information of said users; and
- (iii) electronic certificate register for managing electronic certificates of said users.

31. The system as recited in claim 30, wherein said database further comprises plurality of fields for managing said system, wherein said plurality of fields comprise:

- (i) system configuration for maintaining configuration and preference information of said stake master server; and
- (ii) system mirror image, comprising a plurality of partitions for maintaining a plurality of versions of system mirror images for said stake master server.

32. The system as recited in claim 31, wherein said database yet further comprises a plurality of fields for organizing resources, integrating services, and generating said portal, wherein said plurality of fields comprise:

- (i) application programs for storing a collection of service task-oriented programs providing controller functions to collate data and various services available through said corresponding stake master server;
- (ii) a resource directory for maintaining a collection of Uniform Resource Identifiers of service providers that are collected by at least one of said first and said second stake master servers;
- (iii) said service repository for managing services that have been agreed between said user and said stakeholders and provided through said first master and said second stake master servers;

- (iv) application portlets for defining a portion of said portal by itself or in conjunction with corresponding applications of said server application programs stored in said application program;
- (v) stakeholder proprietary data for managing stakeholder profiles and preferences, marketing data, statistical data, policies, rules and agreement governing data transfer among said stake master servers;
- (vi) data warehouse for storing multimedia files and data in various formats; and
- (vii) template for managing forms and templates for displayable pages for generating said portal dynamically.

33. The system as recited in claim 32, wherein said resources of said service repository is organized in a plurality of layered groups, comprising services, categories, and types.

34. The system as recited in claim 1 further comprises a staging server for testing and verifying a system image for one of said first and said second stake master servers.

35. A method for dynamically generating a user-centric portal in a hieratically layered and distributed network, comprising the steps of:

- (i) receiving a request for said user-centric portal at one of first stake master servers, second stake master servers and third stake master servers directly or through a network access server from a user through a browser with user identification and password;

wherein said first, second and third stake master servers are servers of web services;

wherein said first stake master servers are aggregated by said network access server;

wherein each of said first stake master servers aggregating a plurality of said second stake master servers establishing first communication network links therewith;

wherein each of said plurality of said second stake master servers aggregating a plurality of said third stake master servers establishing second communication network links therewith; and

wherein each of said plurality of said third stake master servers aggregating a plurality of home devices;

- (ii) redirecting said request to a corresponding one of said first stake master servers, second stake master servers and said third stake master servers depending on the profile of said user stored in a database at said stake master server that received said request;
- (iii) authenticating said user at said corresponding stake master server;
- (iv) generating said user-centric portal on said corresponding stake master server based on said profile of said user integrating services from associated ones of said first, said second, and said third stake master servers; and
- (v) transmitting said user-centric portal to said browser in response to said request by said user.

36. The method as recited in claim 35, wherein said plurality of said first stake master servers form a first service network layer over a first communication network, said plurality of said second stake master servers form a second service network layer over a second communication network, and said plurality of said third stake master servers form a third service network layer over a third communication network.

37. The method as recited in claim 36, wherein said first communication network is established over at least one of Hyper Text Transfer Protocol and Hyper Text Transfer Protocol over Secure Socket Layer for integrating said services among said

first stake master servers by said service integration engines of said first stake master servers.

38. The method as recited in claim 36, wherein said second communication network is for integrating said services among said second stake master servers by said service integration engines of said second stake master servers, and is established over at least one of Simple Object Access Protocol, Extended Markup Language / Extensible Stylesheet Language Transformations and Web Services Description Language.

39. The method as recited in claim 36, wherein said third communication network is for integrating said services among said third stake master servers by said service integration engines of said third stake master servers, and is established over at least one of IEEE 802.11, Bluetooth and IEEE 1394.

40. The method as recited in claim 36, wherein said second service network layer comprises a plurality of sub-layers.

41. The method as recited in claim 35, wherein each of said stake master servers are controlled by a stakeholder.

42. The method as recited in claim 41, wherein said stakeholder is a person or legal entity that has interests or stakes in said system.

43. The method as recited in claim 35, wherein said first communication network links segregate said second stake master servers aggregated by said first servers physically, virtually or physically and virtually.

44. The method as recited in claim 43, wherein said first communication network links segregates said second stake master servers virtually by virtual private network.

45. The method as recited in claim 43, wherein each of said first communication network links facilitates said first and said second stake master servers to integrate said services available through said first and said second stake master servers.

46. The method as recited in claim 35, wherein said second communication network links segregate said third stake master servers aggregated by said second servers physically, virtually or physically and virtually.

47. The method as recited in claim 36, wherein said second communication network links segregates said third stake master servers virtually by virtual local area network.

48. The method as recited in claim 46, wherein each of said second communication links facilitates said second and said third stake master servers to integrate said services available through said second and said third stake master servers.

49. The method as recited in claim 35, wherein said portal comprises a plurality of pages.

50. The method as recited in claim 49, wherein said portal is resized manually by said user selecting a plurality of predetermined display sizes of said browser.

51. The system as recited in claim 49, wherein said portal is automatically resized by said resource organizer automatically detecting display size of said browser.

52. The method as recited in claim 49, wherein said plurality of pages comprise a gate page, a navigation page and a framed header and footer page.

53. The method as recited in claim 52, wherein said gate page comprises areas for said user to enter a user name and password.

54. The method as recited in claim 53, wherein said gate page further comprises a plurality of frames for providing web services available through said first stake master servers and for services particular to a geographical location that said user resides.

55. The method as recited in claim 54, wherein each of said plurality of said frames further comprises a plurality of sub-frames, wherein each of said plurality of said sub-frames bearing Uniform Resource Identifier.

56. The method as recited in claim 55, wherein said user selecting one of said plurality of said sub-frames in one of said plurality of said frames causes said one of said plurality of said frames to refresh for bearing another plurality of said sub-frames.

57. The method as recited in claim 56, wherein said user is navigated to one of said services by selecting any of said plurality of said sub-frames in one of said plurality of said frames within three times.

58. The method as recited in claim 52, wherein said navigation pages comprises a plurality of frames for providing web services available through said corresponding stake master server.

59. The method as recited in claim 58, wherein each of said plurality of said frames further comprises a plurality of sub-frames, wherein each of said plurality of said sub-frames bearing Uniform Resource Identifier.

60. The system as recited in claim 59, wherein said user selecting one of said plurality of said sub-frames in one of said plurality of said frames causes said one of said plurality of said frames to refresh for bearing another plurality of said sub-frames.

61. The method as recited in claim 60, wherein said user is navigated to one of said services by selecting any of said plurality of said sub-frames in one of said plurality of said frames within three times.

62. The method as recited in claim 35, wherein said network management system comprises dynamic host configuration protocol server and dynamic domain name server.

63. The method as recited in claim 35, wherein said user management system comprises functions of user authentication, user authorization and user registration.

64. The method as recited in claim 35, wherein said database comprises a plurality of fields for managing said user profile for said user management, wherein said plurality of fields comprise:

- (i) user credentials for managing credential information for said users;
- (ii) user attribute directory for managing attribute information of said users; and
- (iii) electronic certificate register for managing electronic certificates of said users.

65. The method as recited in claim 64, wherein said database further comprises plurality of fields for managing said system, wherein said plurality of fields comprise:

- (i) system configuration for maintaining configuration and preference information of said stake master server; and
- (ii) system mirror image, comprising a plurality of partitions for maintaining a plurality of versions of system mirror images for said stake master server.

66. The method as recited in claim 65, wherein said database yet further comprises a plurality of fields for organizing resources, integrating services, and generating said portal, wherein said plurality of fields comprise:

- (i) application programs for storing a collection of service task-oriented programs providing controller functions to collate data and various services available through said corresponding stake master server;
- (ii) a resource directory for maintaining a collection of Uniform Resource Identifiers of service providers that are collected by at least one of said first and said second stake master servers;
- (iii) said service repository for managing services that have been agreed between said user and said stakeholders and provided through said first master and said second stake master servers;
- (iv) application portlets for defining a portion of said portal by itself or in conjunction with corresponding applications of said server application programs stored in said application program;
- (v) stakeholder proprietary data for managing stakeholder profiles and preferences, marketing data, statistical data, policies, rules and agreement governing data transfer among said stake master servers;
- (vi) data warehouse for storing multimedia files and data in various formats; and
- (vii) template for managing forms and templates for displayable pages for generating said portal dynamically.

67. The method as recited in claim 66, wherein said resources of said service repository is organized in a plurality of layered groups, comprising services, categories, and types.

68. The method as recited in claim 35 further comprises a staging server for testing and verifying a system image for one of said first and said second stake master servers.

Figure 1

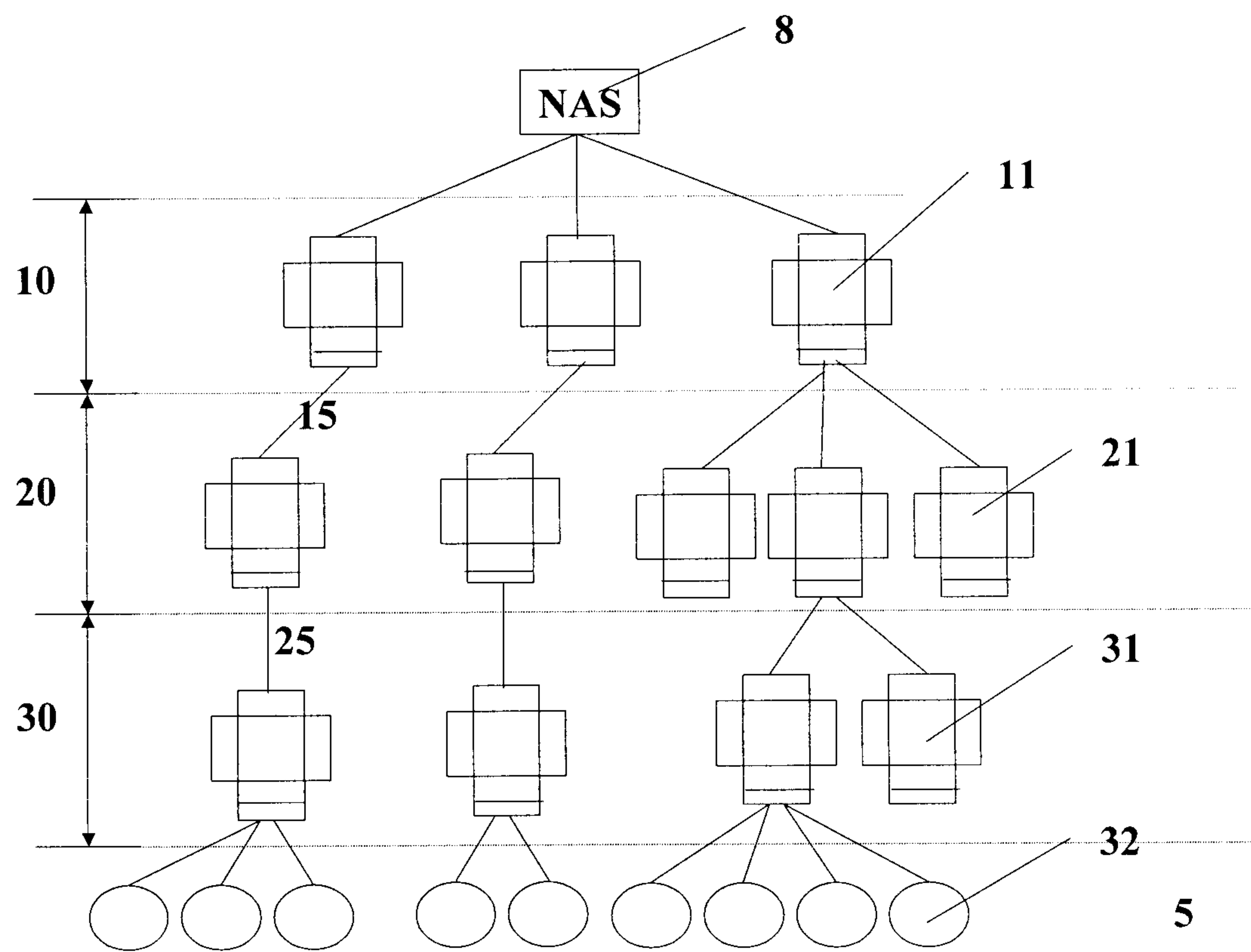


Figure 2

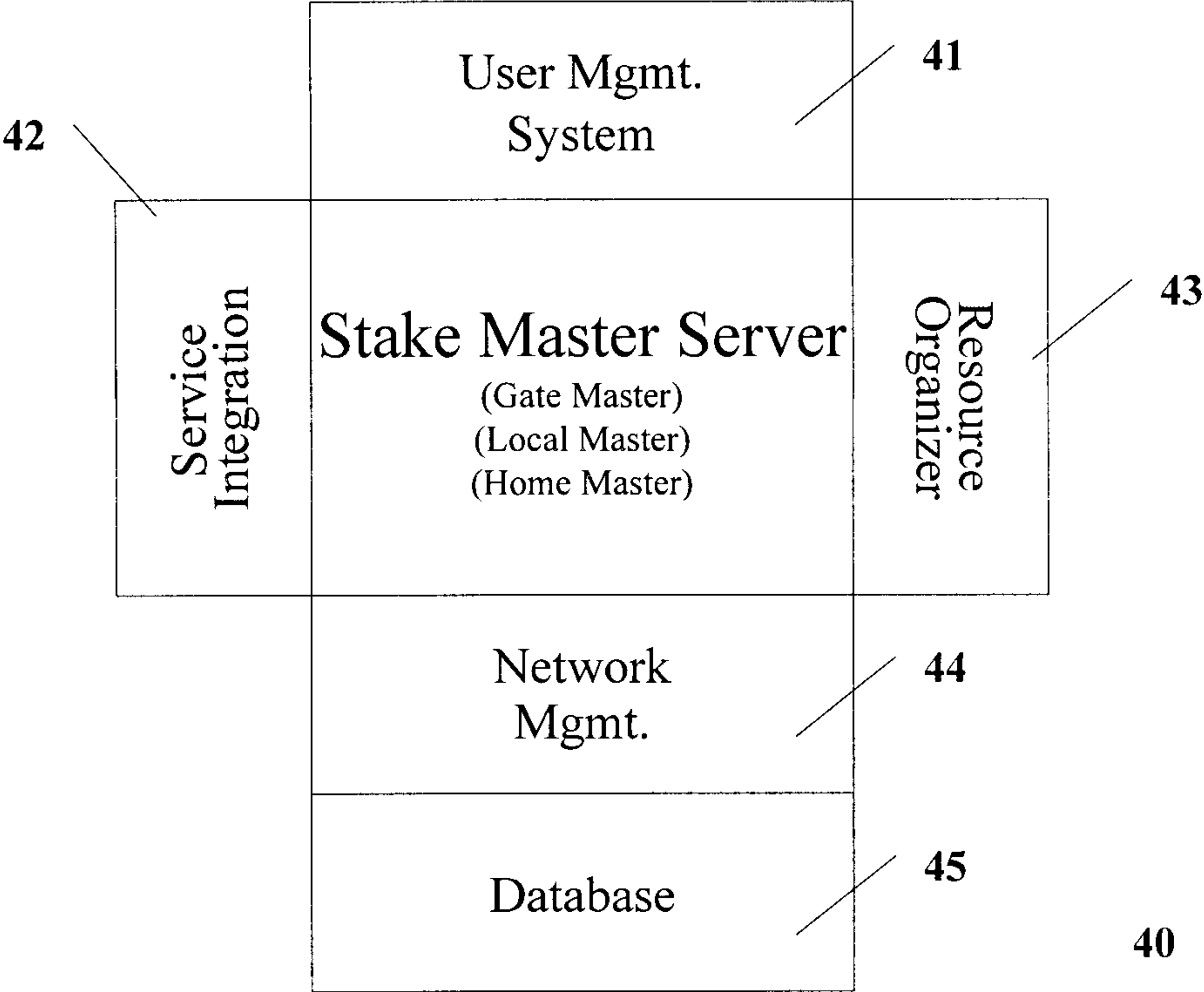


Figure 3

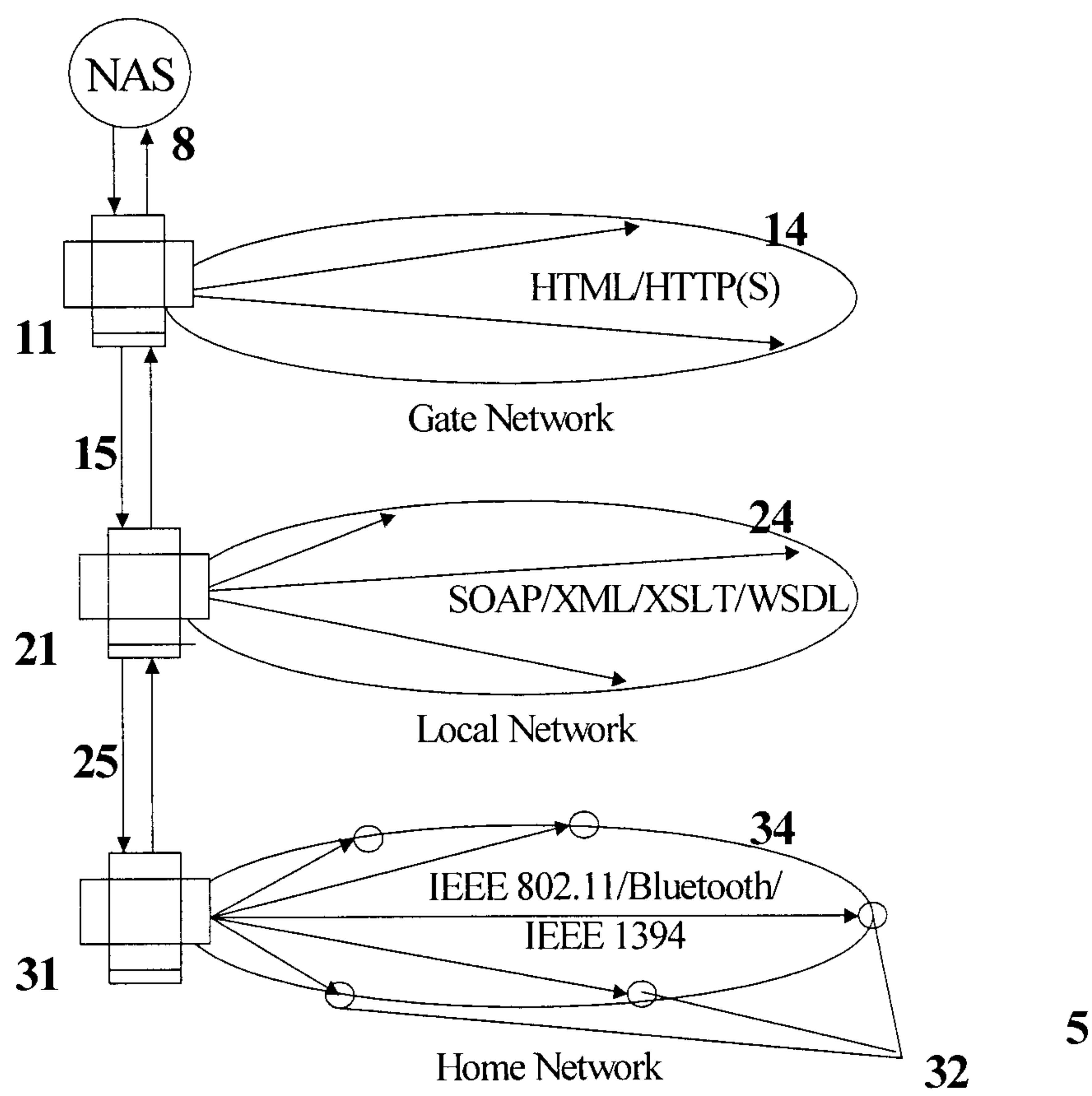


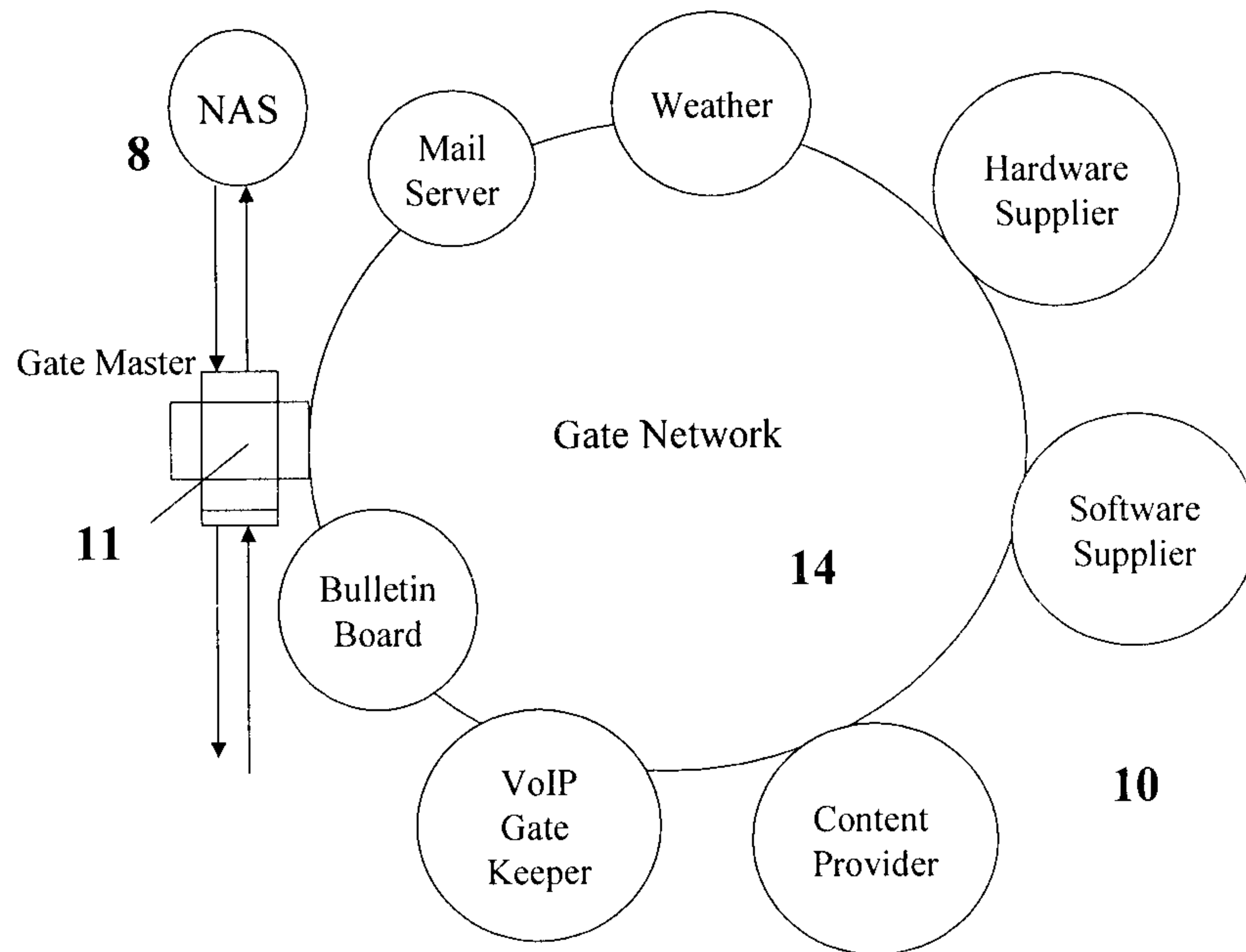
Figure 4

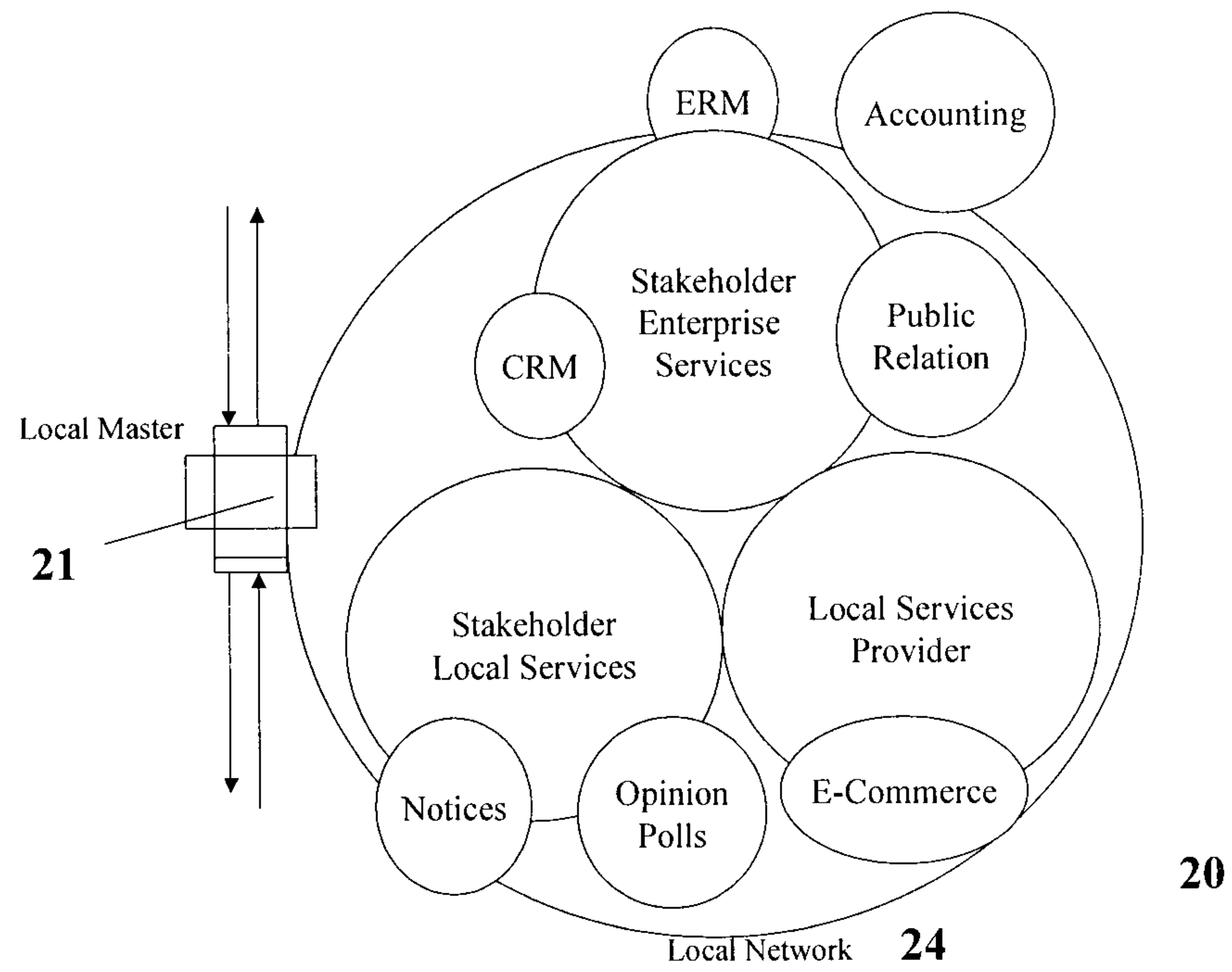
Figure 5

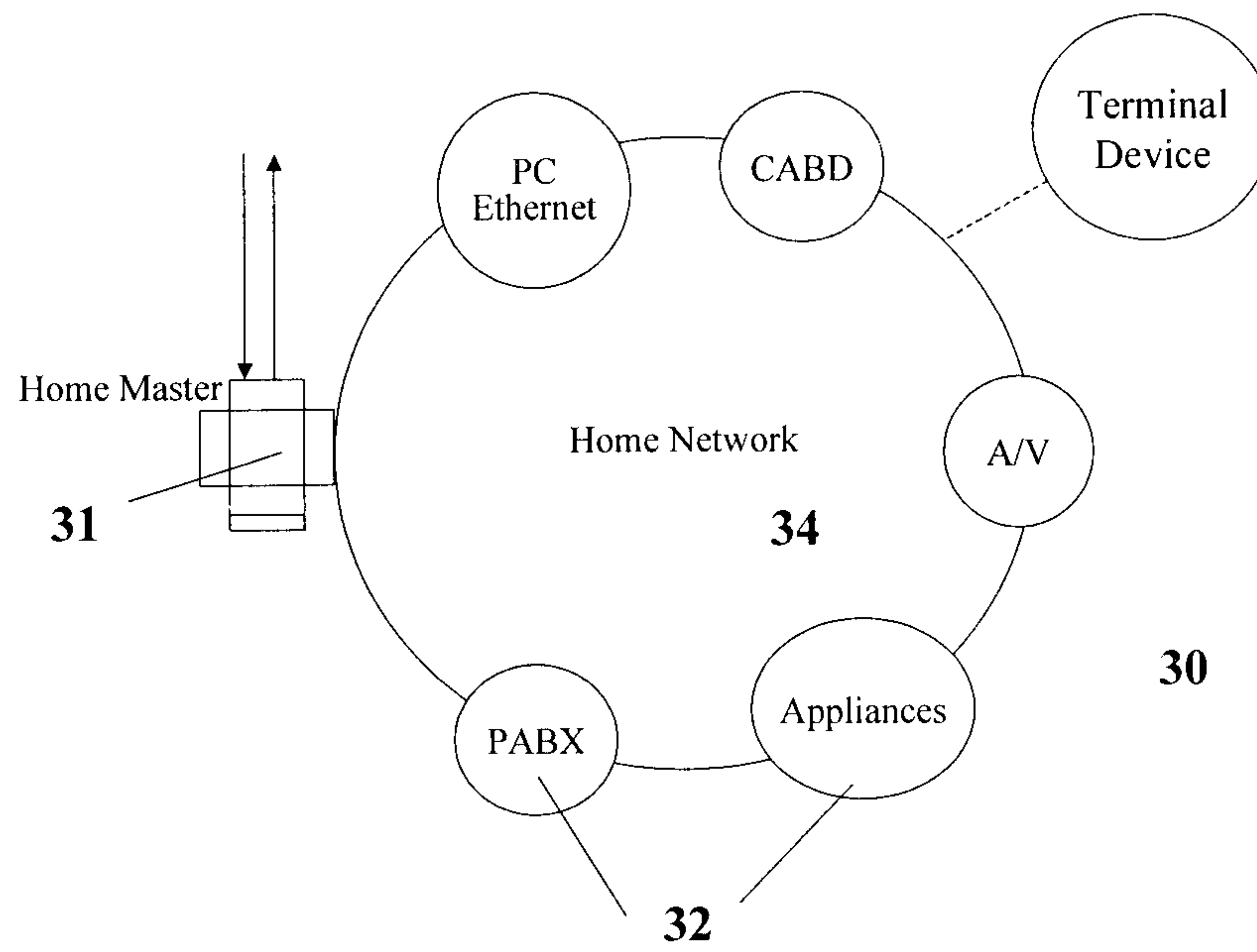
Figure 6

Figure 7

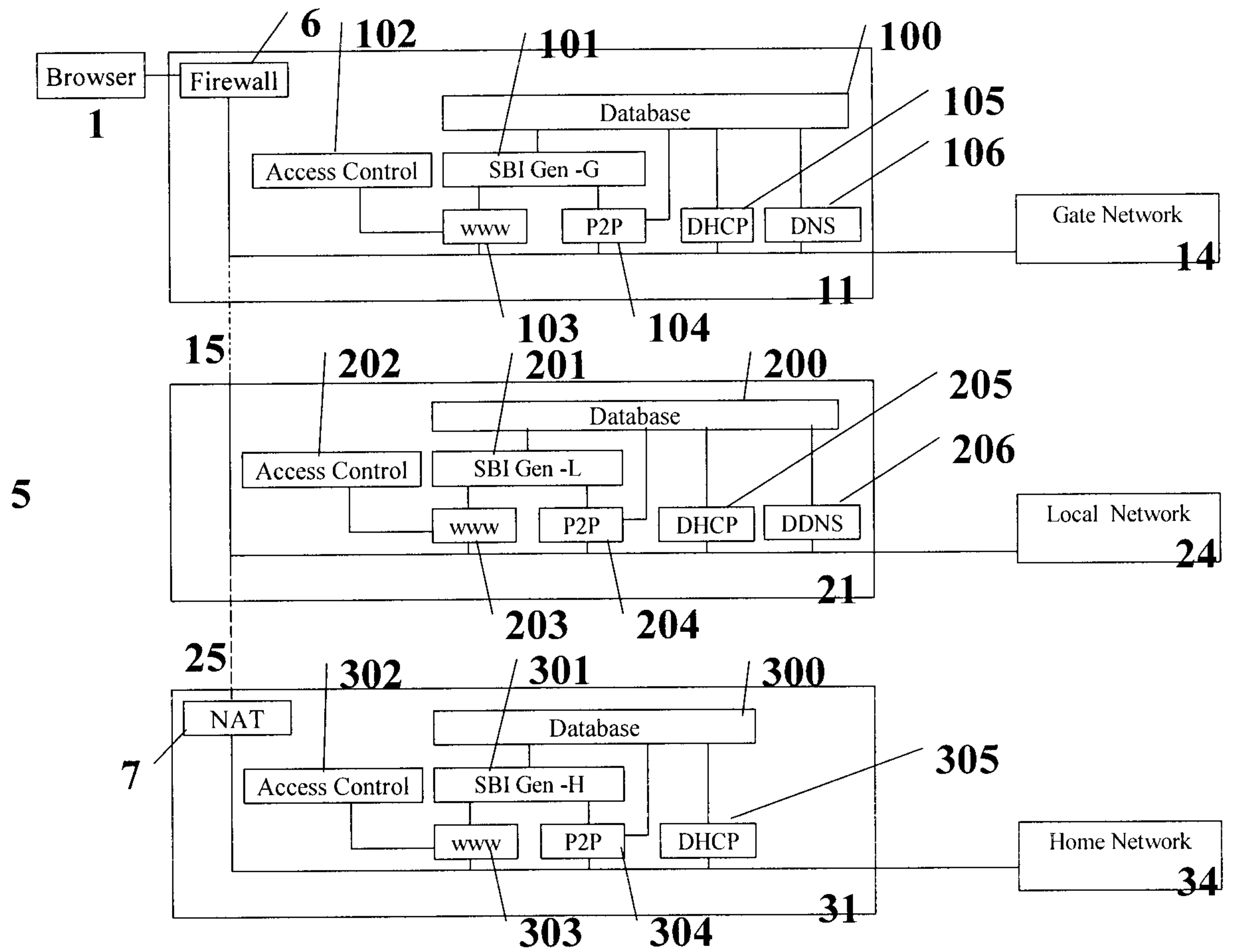


Figure 8

Database				45
User Credentials 60	System Configuration 63	Resources Directory 66	Stakeholder Proprietary Data 69	
User Attributes Directory 61	System Mirror Image 64	Service Repository 67	Data Warehouse 70	
E-Certificate Register 62	Application Programs 65	Application Portlets 68	Template 71	

Figure 9

Access Control		50
Authentication	Authorization	
51	52	
Registration		53
		41

Figure 10

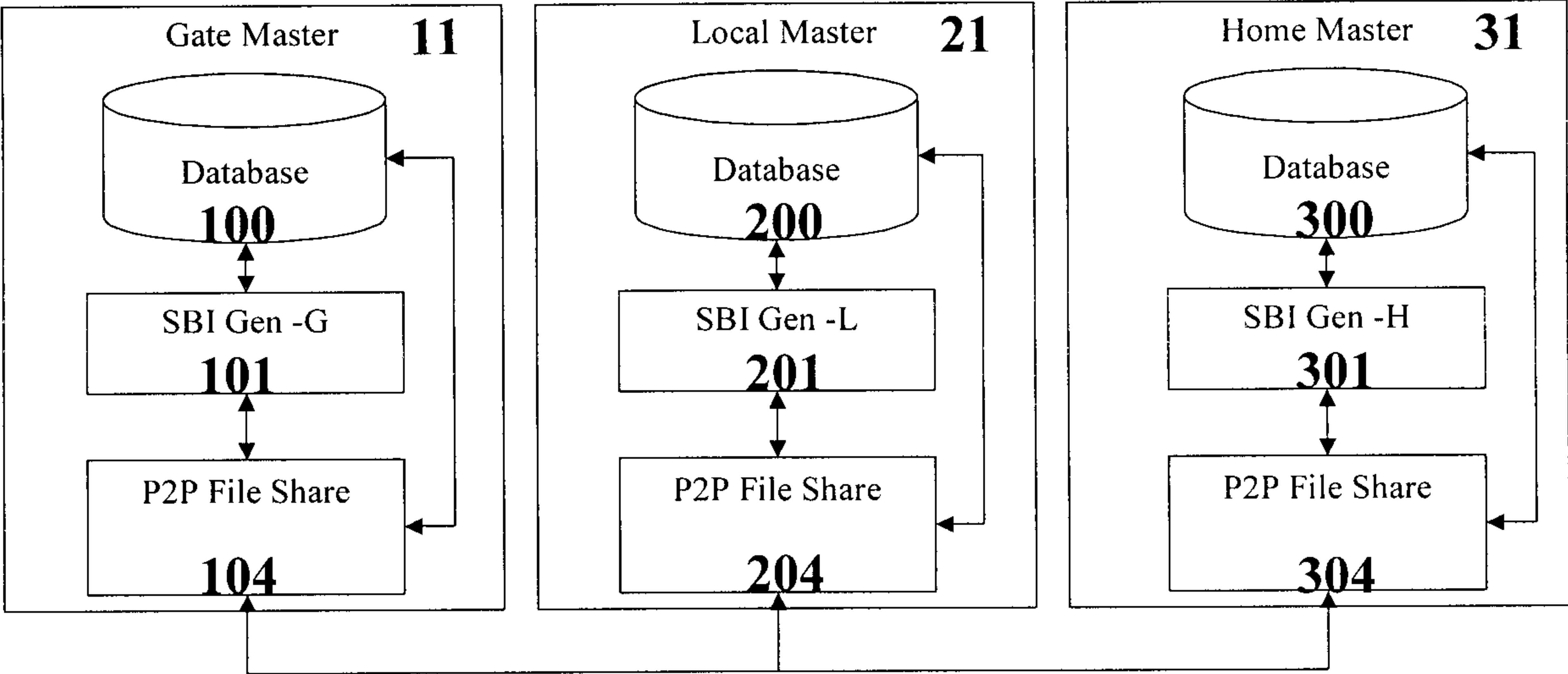


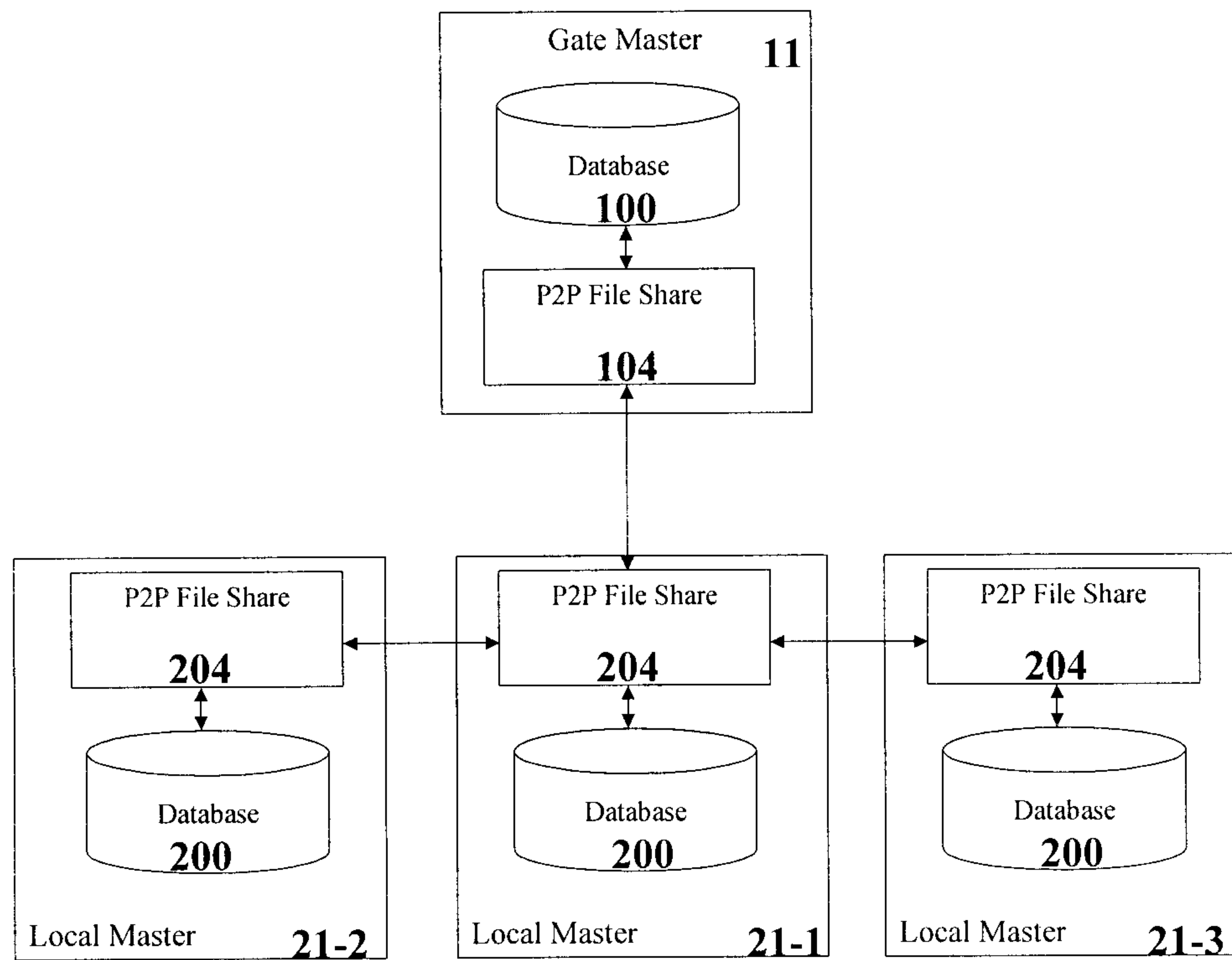
Figure 11

Figure 12

Frame 1				81
Frame 2	82	Frame 3		83
Frame 4	84	Frame 5	85	86
		Frame 6	86	87
Frame 7				
Frame 8	88	Frame 9		89

80

Figure 13

Gate Level 120	SBI-G 110	Gate Page 400	Navigation Page 401G	Header & Footer Page 402G
Local Level 220	SBI-L 210	Gate Page 400	Navigation Page 401L	Header & Footer Page 402L
Home Level 320	SBI-H 310	Gate Page 400	Navigation Page 401H	Header & Footer Page 402H

Figure 14

Location 1 500	Location 2 501	Location 3 502	LOCAL 503
Size 1 504	Size 2 505	Size 3 506	Size 4 507
Text Box 508			
Search 1 509	Search 2 510	Search 3 511	Search 4 512
User Name 513			
Password 514			
Quick 1 515	Quick 2 516	Quick 3 517	Quick 4 518

400

Figure 15

Gate Service Applications		530
Local Service Categories	Share Service Frame	532
531		
Home Links	Home Control Categories	534
533		

401H

Figure 16

Services600	Gate601	Local602	Home603	Others604
Categories610	Weather611	Communications612	Entertainment613	Time614
Types620	Local Weather621	VoIP623	TV625	Local Time627
	International622	email624	DVD626	Target Time628
Resources630	Current Weather631	Local Call633		
	Weather Forecast632	IDD Call634		

550

Figure 17

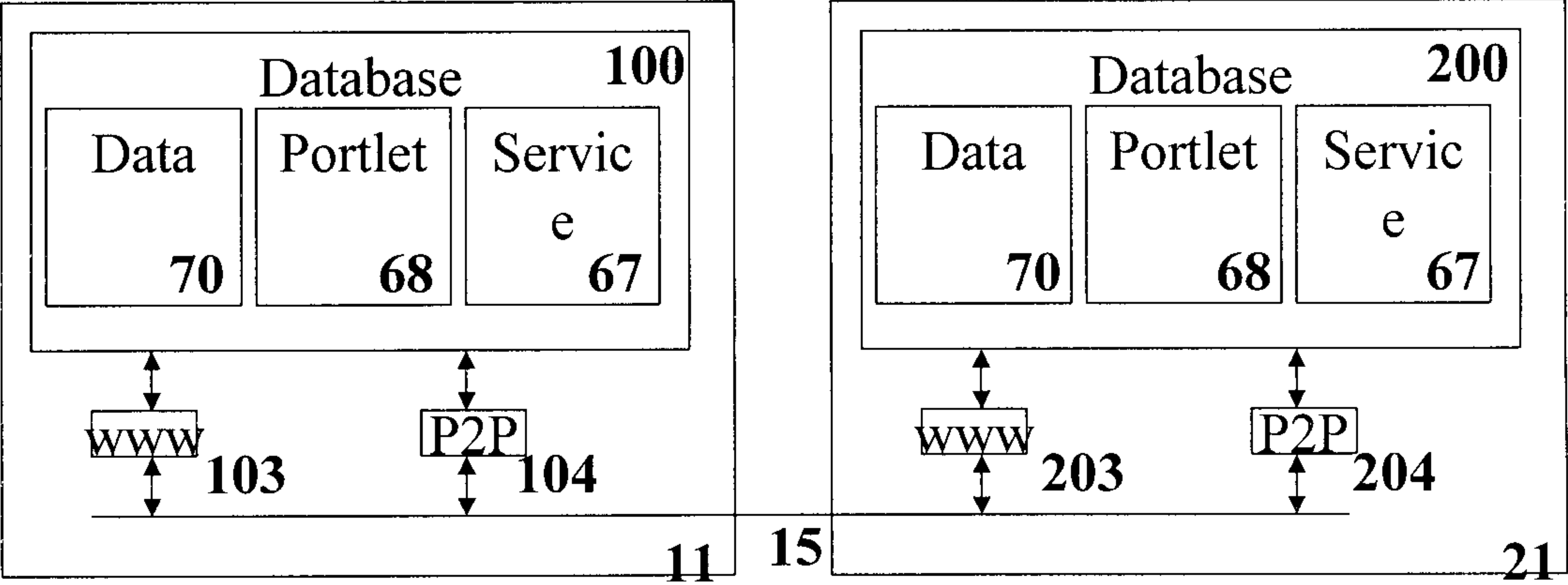


Figure 18-a

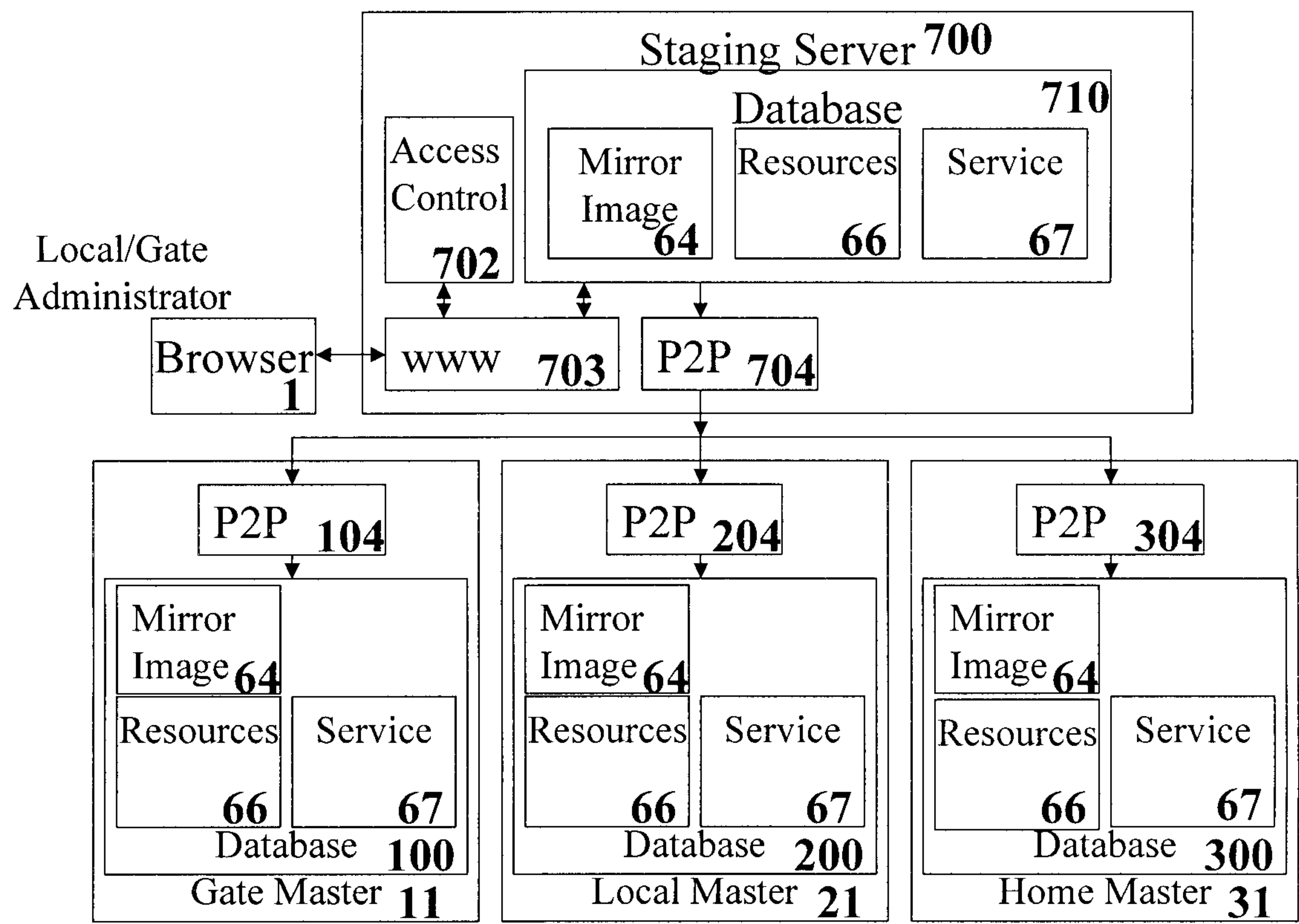


Figure 18-b

