CLAIMS:

1. A user terminal emulation server (100) for providing communication services using sets of input and/or output, I/O, user devices (130), the user terminal emulation server (100) adapted to perform operations comprising:

maintaining (700) a database (120) that identifies network addresses of I/O user devices (130) and further identifies user interface, UI, capabilities of the I/O user devices (130), based on content of received registration messages;

registering (702) a network address of a user terminal emulation application (110) and a unique user identifier with a network entity (150) providing communication services (140), which unique user identifier is transmitted by an electronic device (UserTag#1) carried by a user and received by one or more of the I/O user devices (130) which are proximately located to the user, or determined by biometric operations performed by one or more of the I/O user devices (130) which are proximately located to the user, the user terminal emulation application (110) being executed by the user terminal emulation server (100);

receiving (704) a communication request from the network entity (150) for establishing a communication service between the user (UserTag#1) and a requesting user terminal; and

responsive to the communication request, performing:

identifying (706) a set of I/O user devices among the I/O user devices (130) identified by the database (120) that are determined to be proximately located to a location of the user (UserTag#1) and are further determined, based on the UI capabilities identified by the database (120) for the set of I/O user devices (130) and based on content of the communication request, to satisfy a combined capability rule for being combinable to provide a combined I/O user interface for the user (UserTag#1) to interface with the user terminal emulation application (110) to provide the communication service (140); and

based on determining that the set of I/O user devices (130) satisfies the combined capability rule, performing:

providing (708) communication sessions between the user terminal emulation application (110) and the I/O user devices (130) in the set and between the user terminal emulation application (110) and the requesting user terminal via the network entity (150);

routing (710) communication traffic that is received from at least one of the I/O user devices (130) in the set toward the requesting user terminal; and

for each data type (712) that is received as communication traffic from the requesting user terminal, selecting (714) one of the I/O user devices from among the set of I/O user devices (130) based on matching characteristics of the data type to the UI capabilities identified by the database (120) for the one of the I/O user devices, and then routing the data of the data type toward the network address of the selected one of the I/O user devices;

characterized in being adapted to further perform operations comprising:

receiving another communication request from the network entity (150) for establishing another communication service (140) between another user (UserTag#2) and another requesting user terminal; and

responsive to the another communication request, performing:

determine whether another set of I/O user devices among the I/O user devices (130) identified by the database (120) are determined to be proximately located to a location of the another user (UserTag#2) and available for use for the another communication service (140) and are further determined, based on the UI capabilities identified by the database (120) for the another set of I/O user devices, to satisfy the combined capability rule for being combinable to provide a combined I/O UI for the another user (UserTag#2) to interface with another user terminal emulation application (110) to provide the another communication service (140); and

based on determining that no other set of I/O user devices is determined to satisfy the combined capability rule, available for use by the another communication service (140), and proximately located to the location of the another user (UserTag#2), configure one of the I/O user devices in the set of I/O user devices (130) that is proximately located to the another user (UserTag#2) but is currently being used by the user (UserTag#1), to operate to provide a shared UI that is used by the user (UserTag#1) while the communication service (140) is continuing to be provided to the user (UserTag#1) and that is further used by the another user (UserTag#2) while the another communication service (140) is provided to the another user (UserTag#2).

2. The user terminal emulation server (100) of Claim 1, wherein a speaker device is one of the I/O user devices (130) in the set capable of playing a received audio stream and a microphone device is one of the I/O user devices (130) in the set capable of sensing audio to output a microphone stream, and wherein the operations further comprise:

updating the database (120) based on content of registration messages to identify network addresses of the speaker device and the microphone device, and to identify UI capabilities of the speaker device as having a speaker capability and the microphone device as having a microphone capability;

the speaker device and the microphone device are each identified as belonging to the set of I/O user devices (130) that are determined to be proximately located to the location of the user (UserTag#1) and are further determined, based on the UI capabilities identified by the database (120), to satisfy the combined capability rule for being combinable to provide a combined I/O UI for the user (UserTag#1) to interface with the user terminal emulation application (110) to provide the communication service (140); and

based on determining that the speaker device and the microphone device satisfy the combined capability rule, further operations are performed to:

route a microphone stream received from the microphone device toward the requesting user terminal; and

when an audio stream is received as communication traffic from the requesting user terminal, selecting the speaker device based on matching an audio characteristic of the audio stream to the speaker capability identified by the database for the speaker device, and then routing the audio stream toward the network address of the speaker device.

3. The user terminal emulation server (100) of Claim 2, wherein a display device is one of the I/O user devices (130) in the set capable of displaying a received video stream, and wherein the operations further comprise:

updating the database (120) based on content of registration messages to identify network addresses of the display device, and to identify UI capabilities of the display device as having a display capability;

the display device is also identified as among the set of I/O user devices (130) that is determined to be proximately located to the location of the user (UserTag#1) and are further determined, based on the UI capabilities identified by the database (120), to satisfy the combined capability rule for being combinable to provide the combined I/O UI for the user to interface with the user terminal emulation application (110) to provide the communication service (140); and

based on determining that the speaker device, the display device, and the microphone device satisfy the combined capability rule, further operations are performed to:

when a video stream is received as communication traffic from the requesting user terminal, selecting the display device based on matching a video characteristic of the video stream to the display capability identified by the database (120) for the display device, and then routing the video stream toward the network address of the display device.

4. The user terminal emulation server (100) of Claim 3, wherein the operations for routing the audio stream and the video stream toward the network addresses of the speaker device and the display device, respectively, comprise:

when audio data and video data are received within a same stream from the requesting user terminal through a first communication session, separating the audio data from the video data, routing the audio data toward the network address of the speaker device through a second communication session, and

routing the video data toward the network address of the display device through the second communication session or a third communication session.

5. The user terminal emulation server (100) of any of Claims 2 to 4, wherein a camera device is one of the I/O user devices (130) in the set capable of outputting a camera stream, and wherein the operations further comprise:

updating the database (120) based on content of a registration message to identify a network address of the camera device and to identify a UI capability of the camera device as having a camera capability;

the camera device is further identified as a member of the set of I/O user devices (130) that are determined to be proximately located to the location of the user (UserTag#1) and is further determined, based on the UI capability identified by the database (120), to satisfy the combined capability rule for being combinable with the other I/O user devices (130) in the set to provide the combined I/O UI for the user to interface with the user terminal emulation application (110) to provide the communication service (140); and

based on determining that the camera device satisfies the combined capability rule, further operations are performed to route the camera stream received from the camera device toward the requesting user terminal.

6. The user terminal emulation server (100) of Claim 5, wherein the operations for routing the microphone stream received from the microphone device and the camera stream received from the camera device toward the requesting user terminal, comprise:

receiving the microphone stream from the microphone device through a first communication session;

receiving the camera stream from the camera device through the first communication session or a second communication session;

combining (716) the microphone stream and camera stream in a combined stream; and

routing the combined stream toward the requesting user terminal through a third communication session.

7. The user terminal emulation server (100) of any of Claims 2 to 6, wherein a keyboard device is one of the I/O user devices (130) in the set capable of outputting key selection data responsive to key selections by a user among keys of the keyboard device, and wherein the operations further comprise:

updating the database (120) based on content of a registration message to identify a network address of the keyboard device and to identify a UI capability of the keyboard device as having a keyboard capability;

the keyboard device is further identified as a member of the set of I/O user devices (130) that are determined to be proximately located to the location of the user and is further determined, based on the UI capability identified by the database, to satisfy the combined capability rule for being combinable with the other I/O user devices (130) in the set to provide the combined I/O UI for the user (UserTag#1) to interface with the user terminal emulation application (110) to provide the communication service (140); and

based on determining that the keyboard device satisfies the combined capability rule, further operations are performed to identify commands formed by the key selection data received from the keyboard device and to perform operations that have been defined as being triggered based on receipt of the identified commands.

8. The user terminal emulation server (100) of Claim 7, wherein the operations for routing the key selection data received from the keyboard device and microphone stream received from the microphone device, comprise:

receiving the key selection data from the keyboard device through a first communication session;

receiving the microphone stream from the microphone device through the first communication session or a second communication session;

combining the key selection data and the microphone stream in a combined stream; and

routing the combined stream toward the requesting user terminal through a third communication session.

9. The user terminal emulation server (100) of any of Claims 1 to 8, wherein the operations further comprise:

receiving presence reports from individual ones of the I/O user devices (130) containing their network address and a user identifier of a user (UserTag#1) who is determined by the I/O user device to be proximately located; and

responsive to the presence reports updating the database (120) to indicate which user identifiers (UserTag#1) are proximately located to which of the I/O user devices (130).

10. The user terminal emulation server (100) of any of Claims 1 to 9, wherein:

the communication request contains an indication of a minimum UI capability that must be provided to the user (UserTag#1) during the communication service (140); and

the combined capability rule is defined based on the minimum UI capability that is indicated by the communication request.

11. The user terminal emulation server (100) of any of Claims 1 to 10, wherein the operations further comprise:

based on determining that no other set of I/O user devices is determined to satisfy the combined capability rule and be proximately located to the location of the another user (UserTag#2), communicate a message to the network entity (150) indicating that the another communication service cannot be established.

12. The user terminal emulation server (100) of any of Claims 1 to 11, wherein the operation to register the network address of the user terminal emulation application (110) and the user identifier (UserTag#1) with the network entity (150) comprises:

registering the network address of the user terminal emulation application (110) and the user identifier (UserTag#1) with a network server of a voice over Internet protocol, VoIP, communication service provider.

13. The user terminal emulation server (100) of any of Claims 1 to 12, wherein the operation to register the network address of the user terminal emulation application (110) and the user identifier (UserTag#1) with the network entity (150) comprises:

registering the network address of the user terminal emulation application (110) and the user identifier (UserTag#1) with a core network of a cellular communication service provider.

14. The user terminal emulation server (100) of any of Claims 1 to 13, wherein the operations further comprise:

receiving the registration messages from the I/O user devices (130) using the Session Initiation Protocol/Session Description Protocol, wherein each of the registration messages identifies the network address and the UI capability of one of the I/O user devices.

15. The user terminal emulation server (100) of any of Claims 1 to 14, wherein:

the communication request is received from the network entity (150) using the Session Description Protocol; and

the operation to provide communication sessions between the user terminal emulation application (110) and each of the I/O user devices (130) in the set, and between the user terminal emulation application (110) and the requesting user terminal, is performed using the Session Initiation Protocol.

16. An input and/or output, I/O, user device (130) among a plurality of I/O user devices (130) that is configured as a controlling I/O user device providing communication services (140) using a set of the I/O user devices (130), the controlling I/O user device adapted to perform operations comprising:

maintaining a database (120) that identifies network addresses of the I/O user devices and further identifies user interface, UI, capabilities of the I/O user devices, based on content of received registration messages;

registering a network address of a user terminal emulation application and a unique user identifier with a network entity (150) providing communication services (140), which unique user identifier is transmitted by an electronic device (UserTag#1) carried by a user and received by one or more of the I/O user devices (130) which are proximately located to the user, or determined by biometric operations performed by one or more of the I/O user devices (130) which are proximately located to the user, the user terminal emulation application (912) being executed by the controlling I/O user device;

receiving a communication request from the network entity (150) for establishing a communication service (140) between the user (UserTag#1) and a requesting user terminal; and

responsive to the communication request, performing:

identify the set of I/O user devices among the I/O user devices (130) identified by the database (120) that are determined to be proximately located to a location of the user (UserTag#1) and are further determined, based on the UI capabilities identified by the database (120) for the set of I/O user devices (120) and based on content of the communication request, to satisfy a combined capability rule for being combinable to provide a combined I/O user interface for the user (UserTag#1) to interface with the user terminal emulation application (912) to provide the communication service (140); and

based on determining that the set of I/O user devices satisfies the combined capability rule, perform:

provide communication sessions between the user terminal emulation application (912) and each of the I/O user devices in the set, and between the user terminal emulation application (912) and the requesting user terminal via the network entity (150);

routing communication traffic that is received from at least one of the I/O user devices in the set toward the requesting user terminal; and

for each data type that is received as communication traffic from the requesting user terminal,

selecting one of the I/O user devices from among the set of I/O user devices based on matching characteristics of the data type to the UI capabilities identified by the database for the one of the I/O user devices, and then routing the data of the data type toward the network address of the selected one of the I/O user devices;

characterized in being adapted to further perform operations comprising:

receiving another communication request from the network entity (150) for establishing another communication service (140) between another user (UserTag#2) and another requesting user terminal; and

responsive to the another communication request, performing:

determine whether another set of I/O user devices among the I/O user devices (130) identified by the database (120) are determined to be proximately located to a

location of the another user (UserTag#2) and available for use for the another communication service (140) and are further determined, based on the UI capabilities identified by the database (120) for the another set of I/O user devices, to satisfy the combined capability rule for being combinable to provide a combined I/O UI for the another user (UserTag#2) to interface with another user terminal emulation application (110) to provide the another communication service (140); and

based on determining that no other set of I/O user devices is determined to satisfy the combined capability rule, available for use by the another communication service (140), and proximately located to the location of the another user (UserTag#2),

configure one of the I/O user devices in the set of I/O user devices (130) that is proximately located to the another user (UserTag#2) but is currently being used by the user (UserTag#1), to operate to provide a shared UI that is used by the user (UserTag#1) while the communication service (140) is continuing to be provided to the user (UserTag#1) and that is further used by the another user (UserTag#2) while the another communication service (140) is provided to the another user (UserTag#2).

17. The controlling I/O user device (130) of Claim 16, wherein the operations further comprise:

receiving presence reports from individual ones of the I/O user devices containing their network address and a user identifier of a user (UserTag#1) who is determined by the I/O user device to be proximately located; and

responsive to the presence reports updating the database (120) to indicate which user identifiers (UserTag#1) are proximately located to which of the I/O user devices (130).

18. The controlling I/O user device (130) of any of Claims 16 to 17, wherein:

the communication request contains an indication of a minimum UI capability that must be provided to the user (UserTag#1) during the communication service (140); and

the combined capability rule is defined based on the minimum UI capability that is indicated by the communication request.

19. The controlling I/O user device (130) of any of Claims 16 to 18, wherein a speaker device is one of the I/O user devices (130) in the set capable of playing a received audio stream and a microphone device is one of the I/O user devices in the set capable of sensing audio to output a microphone stream, and wherein the operations further comprise:

updating the database (120) based on content of registration messages to identify network addresses of the speaker device and the microphone device, and to identify UI capabilities of the speaker device as having a speaker capability and the microphone device as having a microphone capability;

the speaker device and the microphone device are each identified as belonging to the set of I/O user devices that are determined to be proximately located to the location of the user (UserTag#1) and are further determined, based on the UI capabilities identified by the database, to satisfy the combined capability rule for being combinable to provide a combined I/O UI for the user to interface with the user terminal emulation application to provide the communication service (140); and

based on determining that the speaker device and the microphone device satisfy the combined capability rule, further operations are performed to:

route a microphone stream received from the microphone device toward the requesting user terminal; and

when an audio stream is received as communication traffic from the requesting user terminal, selecting the speaker device based on matching an audio characteristic of the audio stream to the speaker capability identified by the database for the speaker device, and then routing the audio stream toward the network address of the speaker device.

20. The controlling I/O user device (130) of Claim 19, wherein a display device is one of the I/O user devices (130) in the set capable of displaying a received video stream, and wherein the operations further comprise:

updating the database (120) based on content of registration messages to identify network addresses of the display device, and to identify UI capabilities of the display device as having a display capability;

the display device is also identified as among the set of I/O user devices (130) that is determined to be proximately located to the location of the user (UserTag#1) and are further determined, based on the UI capabilities identified by the database (120), to satisfy the combined capability rule for being combinable to provide the combined I/O UI for the user (UserTag#1) to interface with the user terminal emulation application to provide the communication service (140); and

based on determining that the speaker device, the display device, and the microphone device satisfy the combined capability rule, further operations are performed to:

when a video stream is received as communication traffic from the requesting user terminal, selecting the display device based on matching a video characteristic of the video stream to the display capability identified by the database for the display device, and then routing the video stream toward the network address of the display device.

21. A computer program product comprising a non-transitory computer readable medium storing program code that, if executed by a processor (1000) in a user terminal emulation server (100) for providing communication services (140) using sets of input and/or output, I/O, user devices (130), cause the processor (1000) to perform operations comprising:

maintaining a database (120) that identifies network addresses of I/O user devices and further identifies user interface, UI, capabilities of the I/O user devices, based on content of received registration messages;

registering a network address of a user terminal emulation application (110, 1012) and a unique user identifier with a network entity (150) providing communication services (140), which unique user identifier is transmitted by an electronic device (UserTag#1) carried by a user and received by one or more of the I/O user devices (130) which are proximately located to the user, or determined by biometric operations performed by one or more of the I/O user devices (130) which are proximately located to the user, the user terminal emulation application (110, 1012) being executed by the user terminal emulation server (100);

receiving a communication request from the network entity (150) for establishing a communication service (140) between the user (UserTag#1) and a requesting user terminal; and

responsive to the communication request, performing:

identifying a set of I/O user devices among the I/O user devices (130) identified by the database (120) that are determined to be proximately located to a location of the user (UserTag#1) and are further determined, based on the UI capabilities identified by the database (120) for the set of I/O user devices (130) and based on content of the communication request, to satisfy a combined capability rule for being combinable to provide a combined I/O user interface for the user (UserTag#1) to interface with the user terminal emulation application (110, 1012) to provide the communication service (140); and

based on determining that the set of I/O user devices satisfies the combined capability rule, performing:

providing communication sessions between the user terminal emulation application (110, 1012) and the I/O user devices in the set and between the user terminal emulation application (110, 1012) and the requesting user terminal via the network entity (150);

routing communication traffic that is received from at least one of the I/O user devices (130) in the set toward the requesting user terminal; and

for each data type that is received as communication traffic from the requesting user terminal, selecting one of the I/O user devices from among the set of I/O user devices (130) based on matching characteristics of the data type to the UI capabilities identified by the database (120) for the one of the I/O user devices, and then routing the data of the data type toward the network address of the selected one of the I/O user devices;

characterized in causing the processor to further perform operations comprising:

receiving another communication request from the network entity (150) for establishing another communication service (140) between another user (UserTag#2) and another requesting user terminal; and

responsive to the another communication request, performing:

determine whether another set of I/O user devices among the I/O user devices (130) identified by the database (120) are determined to be proximately located to a location of the another user (UserTag#2) and available for use for the another communication service (140) and are further determined, based on the UI capabilities identified by the database (120) for the another set of I/O user devices, to satisfy the combined capability rule for being combinable to provide a combined I/O UI for the another user (UserTag#2) to interface with another user terminal emulation application (110) to provide the another communication service (140); and

based on determining that no other set of I/O user devices is determined to satisfy the combined capability rule, available for use by the another communication service (140), and proximately located to the location of the another user (UserTag#2),

configure one of the I/O user devices in the set of I/O user devices (130) that is proximately located to the another user (UserTag#2) but is currently being used by the user (UserTag#1), to operate to provide a shared UI that is used by the user (UserTag#1) while the communication service (140) is continuing to be provided to the user (UserTag#1) and that is further used by the another user (UserTag#2) while the another communication service (140) is provided to the another user (UserTag#2).

22. A computer program product comprising a non-transitory computer readable medium storing program code that, if executed by a processor (900) in an input and/or output, I/O, user device (130) among a plurality of I/O user devices (130) that is configured as a controlling I/O user device providing communication services (140) using a set of the I/O user devices, cause the processor (900) to perform operations comprising:

maintaining a database (120) that identifies network addresses of the I/O user devices and further identifies user interface, UI, capabilities of the I/O user devices, based on content of received registration messages;

registering a network address of a user terminal emulation application (912) and a unique user identifier with a network entity (150) providing communication services (140), which unique user identifier is transmitted by an electronic device (UserTag#1) carried by a user and received by one or more of the I/O user devices (130) which are proximately located to the user, or determined by biometric operations performed by one or more of the I/O user devices (130) which are proximately located to the user, the user terminal emulation application (912) being executed by the controlling I/O user device;

receiving a communication request from the network entity (150) for establishing a communication service (140) between the user (UserTag#1) and a requesting user terminal; and

responsive to the communication request, performing:

identifying the set of I/O user devices among the I/O user devices (130) identified by the database (120) that are determined to be proximately located to a location of the user (UserTag#1) and are further determined, based on the UI capabilities identified by the database (120) for the set of I/O user devices (130) and based on content of the communication request, to satisfy a combined capability rule for being combinable to provide a combined I/O user interface for the user (UserTag#1) to interface with the user terminal emulation application (912) to provide the communication service (140); and

based on determining that the set of I/O user devices satisfies the combined capability rule, performing:

provide communication sessions between the user terminal emulation application (912) and each of the I/O user devices (130) in the set, and between the user terminal emulation application (912) and the requesting user terminal via the network entity (150);

routing communication traffic that is received from at least one of the I/O user devices in the set toward the requesting user terminal; and

for each data type that is received as communication traffic from the requesting user terminal, selecting one of the I/O user devices from among the set of I/O user devices based on matching characteristics of the data type to the UI capabilities identified by the database for the one of the I/O user devices, and then routing the data of the data type toward the network address of the selected one of the I/O user devices;

characterized in causing the processor to further perform operations comprising:

receiving another communication request from the network entity (150) for establishing another communication service (140) between another user (UserTag#2) and another requesting user terminal; and

responsive to the another communication request, performing:

determine whether another set of I/O user devices among the I/O user devices (130) identified by the database (120) are determined to be proximately located to a location of the another user (UserTag#2) and available for use for the another communication service (140) and are further determined, based on the UI capabilities identified by the database (120) for the another set of I/O user devices, to satisfy the combined capability rule for being combinable to provide a combined I/O UI for the another user (UserTag#2) to interface with another user terminal emulation application (110) to provide the another communication service (140); and

based on determining that no other set of I/O user devices is determined to satisfy the combined capability rule, available for use by the another communication service (140), and proximately located to the location of the another user (UserTag#2),

configure one of the I/O user devices in the set of I/O user devices (130) that is proximately located to the another user (UserTag#2) but is currently being used by the user (UserTag#1), to operate to provide a shared UI that is used by the user (UserTag#1) while the communication service (140) is continuing to be provided to the user (UserTag#1) and that is further used by the another user (UserTag#2) while the another communication service (140) is provided to the another user (UserTag#2).