i.e. recipient device. In a base-station based wireless telecommunication network environment, for instance, while routing is performed from end-to-end, congestion control focuses on the nodes to avoid congestion and assumes that the last leg delivery will be straightforward. Two limitations associated with such congestion control algorithms are:

a. When large amounts of data are to be delivered to the recipient device, current routing algorithms will allow delivery of data when there is no congestion detected on the network. However, delivery of large amounts of data could adversely affect the performance of the recipient device, despite the increasingly powerful processors available today. This can result in an unpleasant user experience.

b. Current routing algorithms are not concerned with the last leg of delivery, hence even if the recipient device is in active use (i.e. receiving or transmitting electronic content); current routing algorithms continue to effect delivery. This can also result in an unpleasant user experience.

While there are arguably routing algorithms which consider the activity level on the recipient devices, such routing algorithms typically adopt a marking and dropping of data packets when congestion is detected (i.e. all or nothing approach).

Although there are known routing system which schedule transmission of data packets at predetermined times, these routing systems do not take into consideration congestion levels of the network and size of the data packets.

The present invention seeks to alleviate or reduce the above mentioned drawbacks, or at least provide the public with a useful choice.

## SUMMARY OF THE INVENTION

The present invention provides a system for ~~In accordance with a first aspect of the present invention there is provided a system for~~ routing electronic content to a recipient device comprising a plurality of network nodes, each network node adapted to receive and forward electronic content and

an activity profile server adapted to be in data communication with each network node, the activity profile server adapted to monitor the activity level of each network node and inform each network node on the congestion level of an adjacent network node based on a historical utilization rate of each network node from a network management system or the non-peak usage times based on tracked revenue activities; the activity profile server further adapted to monitor the activity on the recipient device so as to determine a suitable delivery time of the electronic content to the recipient device;

wherein each network node is adapted, on receiving the information on congestion level to store electronic content if the adjacent network node is congested and forward the electronic content to the adjacent network node if the adjacent network node is not congested.

Comprises/comprising and grammatical variations thereof when used in this specification are to be taken to specify the presence of stated features, integers, steps or components or groups thereof, but do not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

The present invention further provides a method of routing electronic content to a recipient device within a network having a plurality of network nodes comprising receiving at a network node electronic content from a source;
monitoring the activity level of each network node based on a historical utilization rate of each network node from a network management system or the non-peak usage times based on tracked revenue activities;
monitoring the activity level on the recipient device so as to determine a suitable delivery time of the electronic content to the recipient device;
informing each network node on the congestion level of the adjacent network node; and
storing the received electronic content if an adjacent network node is congested and forwarding the electronic content to the adjacent network node if the adjacent network node is not congested.

There is described herein a system for routing electronic content to a recipient device comprising a plurality of network nodes, each network node adapted to receive and forward electronic content and an activity profile server adapted to be in data communication with each network node, the activity profile server adapted to monitor the activity level of each network node and inform each network node on the congestion level of an adjacent network node; wherein each network node is adapted, on receiving the information on congestion level to store electronic content if the adjacent network node is congested and forward the electronic content to the adjacent network node if the adjacent network node is not congested.

Preferably, the activity profile server is further adapted to monitor the activity level of the recipient device. The activity profile server may also be adapted to schedule a deferred delivery for the adjacent network node at a time period corresponding to a time period of low activity of the adjacent network node. In this regard, the deferred delivery is scheduled based on a profile of least congestion where a period of low activity could not be found.

Preferably, the recipient device is a mobile device. More preferably the recipient device comprises at least one gyroscopic sensor.

Alternatively, a deferred delivery is scheduled to the recipient device at a time period corresponding to a time period of idleness of the recipient device. The deferred delivery may be scheduled based on a period of low activity of the recipient device in the event where no period of idleness is found. The electronic content may also be broken into a plurality of smaller packets prior to scheduling for deferred forwarding.

~~In accordance with a second aspect of the present invention there is provided~~There is described herein a method of routing electronic content to a recipient device within a network having a plurality of network nodes comprising receiving at a network node electronic content from a source;

Monitoring the activity level of each network node;

20. A ~~system~~ method according to claim 11, wherein electronic content is delivered to the recipient device upon detection that the recipient stays for a prolonged period of time in a network node with relatively lower utilization.

i.e. recipient device. In a base-station based wireless telecommunication network environment, for instance, while routing is performed from end-to-end, congestion control focuses on the nodes to avoid congestion and assumes that the last leg delivery will be straightforward. Two limitations associated with such congestion control algorithms are:

a. When large amounts of data are to be delivered to the recipient device, current routing algorithms will allow delivery of data when there is no congestion detected on the network. However, delivery of large amounts of data could adversely affect the performance of the recipient device, despite the increasingly powerful processors available today. This can result in an unpleasant user experience.

b. Current routing algorithms are not concerned with the last leg of delivery, hence even if the recipient device is in active use (i.e. receiving or transmitting electronic content); current routing algorithms continue to effect delivery. This can also result in an unpleasant user experience.

While there are arguably routing algorithms which consider the activity level on the recipient devices, such routing algorithms typically adopt a marking and dropping of data packets when congestion is detected (i.e. all or nothing approach).

Although there are known routing system which schedule transmission of data packets at predetermined times, these routing systems do not take into consideration congestion levels of the network and size of the data packets.

The present invention seeks to alleviate or reduce the above mentioned drawbacks, or at least provide the public with a useful choice.

## SUMMARY OF THE INVENTION

The present invention provides a system for routing electronic content to a recipient device comprising a plurality of network nodes, each network node adapted to receive and forward electronic content and

an activity profile server adapted to be in data communication with each network node, the activity profile server adapted to monitor the activity level of each network node and inform each network node on the congestion level of an adjacent network node based on a historical utilization rate of each network node from a network management system or the non-peak usage times based on tracked revenue activities; the activity profile server further adapted to monitor the activity on the recipient device so as to determine a suitable delivery time of the electronic content to the recipient device;

wherein each network node is adapted, on receiving the information on congestion level to store electronic content if the adjacent network node is congested and forward the electronic content to the adjacent network node if the adjacent network node is not congested.

Comprises/comprising and grammatical variations thereof when used in this specification are to be taken to specify the presence of stated features, integers, steps or components or groups thereof, but do not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

The present invention further provides a method of routing electronic content to a recipient device within a network having a plurality of network nodes comprising receiving at a network node electronic content from a source;
monitoring the activity level of each network node based on a historical utilization rate of each network node from a network management system or the non-peak usage times based on tracked revenue activities;
monitoring the activity level on the recipient device so as to determine a suitable delivery time of the electronic content to the recipient device;
informing each network node on the congestion level of the adjacent network node; and
storing the received electronic content if an adjacent network node is congested and forwarding the electronic content to the adjacent network node if the adjacent network node is not congested.

There is described herein a system for routing electronic content to a recipient device comprising a plurality of network nodes, each network node adapted to receive and forward electronic content and an activity profile server adapted to be in data communication with each network node, the activity profile server adapted to monitor the activity level of each network node and inform each network node on the congestion level of an adjacent network node; wherein each network node is adapted, on receiving the information on congestion level to store electronic content if the adjacent network node is congested and forward the electronic content to the adjacent network node if the adjacent network node is not congested.

Preferably, the activity profile server is further adapted to monitor the activity level of the recipient device. The activity profile server may also be adapted to schedule a deferred delivery for the adjacent network node at a time period corresponding to a time period of low activity of the adjacent network node. In this regard, the deferred delivery is scheduled based on a profile of least congestion where a period of low activity could not be found.

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There is described herein a method of routing electronic content to a recipient device within a network having a plurality of network nodes comprising receiving at a network node electronic content from a source;

Monitoring the activity level of each network node;

20. A method according to claim 11, wherein electronic content is delivered to the recipient device upon detection that the recipient stays for a prolonged period of time in a network node with relatively lower utilization.