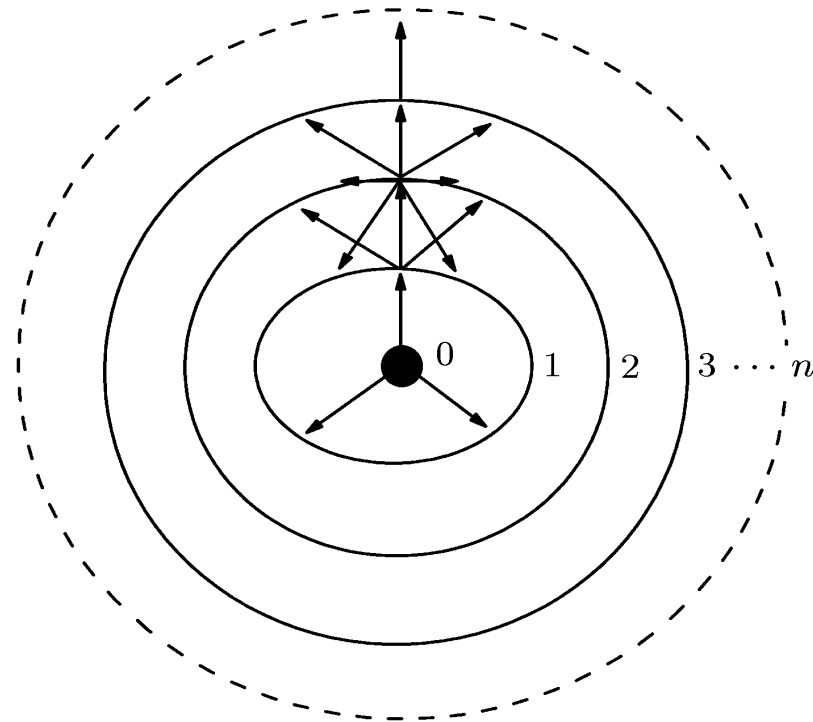# Epi - Epidemic Diffusion

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Epidemic Diffusion

Definition

The spreading epidemic is under constant study, being considered a high level of innovation in area of technology science.

In figure above we have a schematic illustration of epidemic diffusion on a complex network, where the centre denotes the original seed. The numbers 0,1,2, … denote the distance from the original seed, and the arrows denote the possible infection paths.

In diffusion when a node is infected, one of its neighbouring nodes will be infected at the next step, reducing so the density of infected nodes.

It is in fact a kind of reaction diffusion process and uses a gossip protocol in order to establish the connection within the network.

Because of the form of gossip is seen in social networks, this protocol is a style of computer-to-computer communication protocol. Several distributed systems often use gossip protocols to solve problems that it could be difficult to solve by using others ways, either because the underlying network has an inconvenient structure, or is extremely large, or because gossip solutions is considered the most efficient ones available.

Epi

Description

Epi is an application that, using Wi-Fi interfaces, facilitates the spread of text messaging between users that are close, since there is no need to Internet connection. For example, one possible scenario for sending and receiving messages between users of Epi is when we are in a public establishment with one or more Wi-Fi networks, we turn on the laptop and some of these networks presents us with the registration on the network without prior authentication, and provided us with an IP address. Consequently, when we are trying to access the Internet through a browser, we are headed to a service provider authentication site. Then, it is made a record on this network, even without Internet access, and it is possible to use the Epi application.

A special feature of this application is that messages that are sent at a specific location, in which there is no Epi user, are stored and, subsequently, propagated in other areas where Epi is being used.

This application lets you send messages between the users that are connected to a network, even if this connection has been made in differently forms. In other words, the user may be using the Wi-Fi network interface to connect to a network in ad-hoc, can possibly create an own ad-hoc network, or even be connected to an access point that does not have an Internet connection.
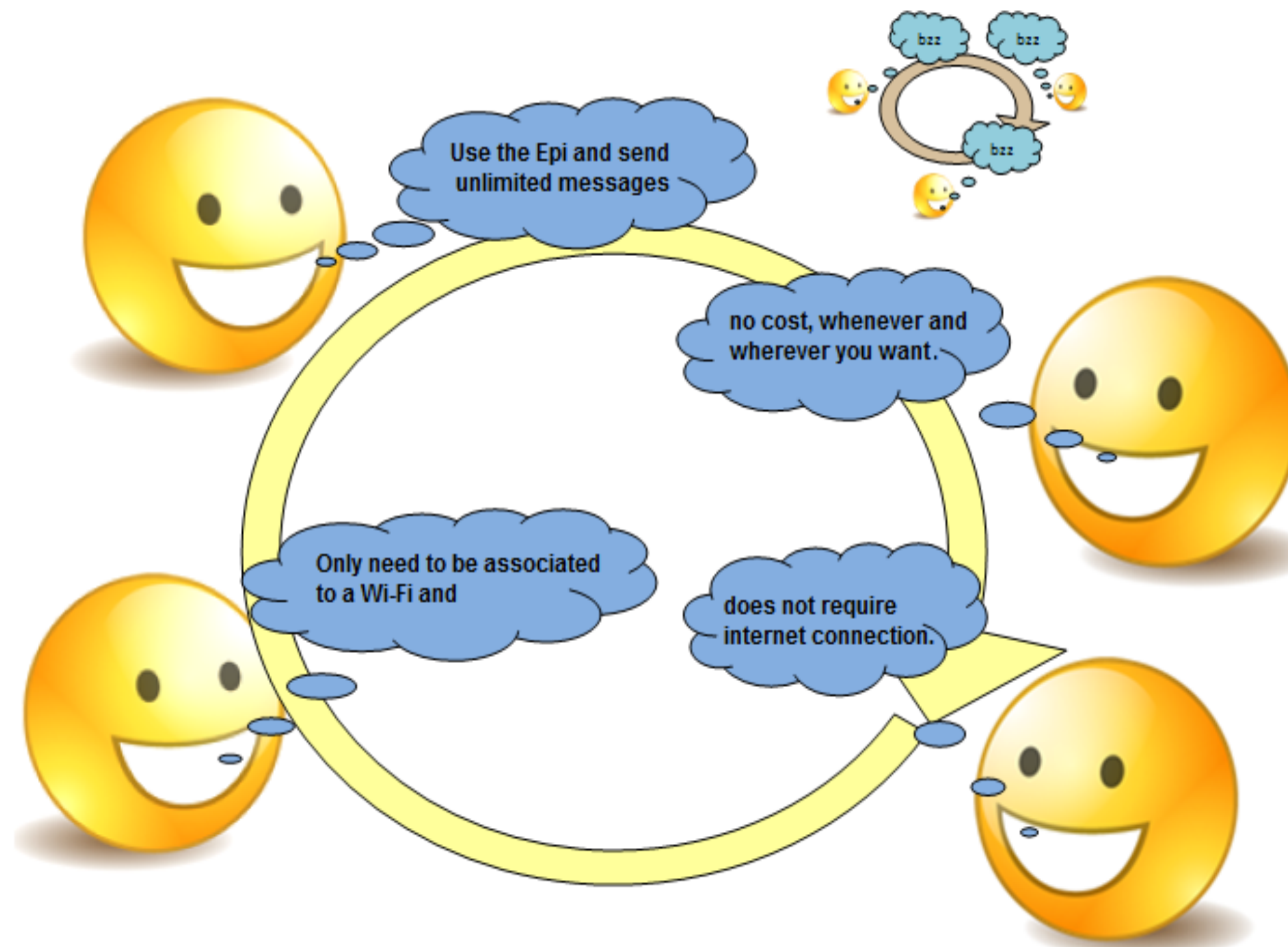

Problems

- It does not work in any other operating system besides Windows;
- It is available in one language (Portuguese);
- It only work on the computer;
- The users who intend to carry out the exchange of messages are not exactly on the same network, they will never receive the messages of the other user that is in a different network;
- The interface:
  - Cancel button, in the sending interface, displays the same function to minimize;

Improvements

- It should be possible to choose the language to be used;
- It should be compatible to any operation system;
- Extend this application for mobile phones and Bluetooth interfaces;
- It could jointly enable the user to send files to your neighborhood;
  - It should, consequently, have security and privacy protocols to this sends;

Functioning
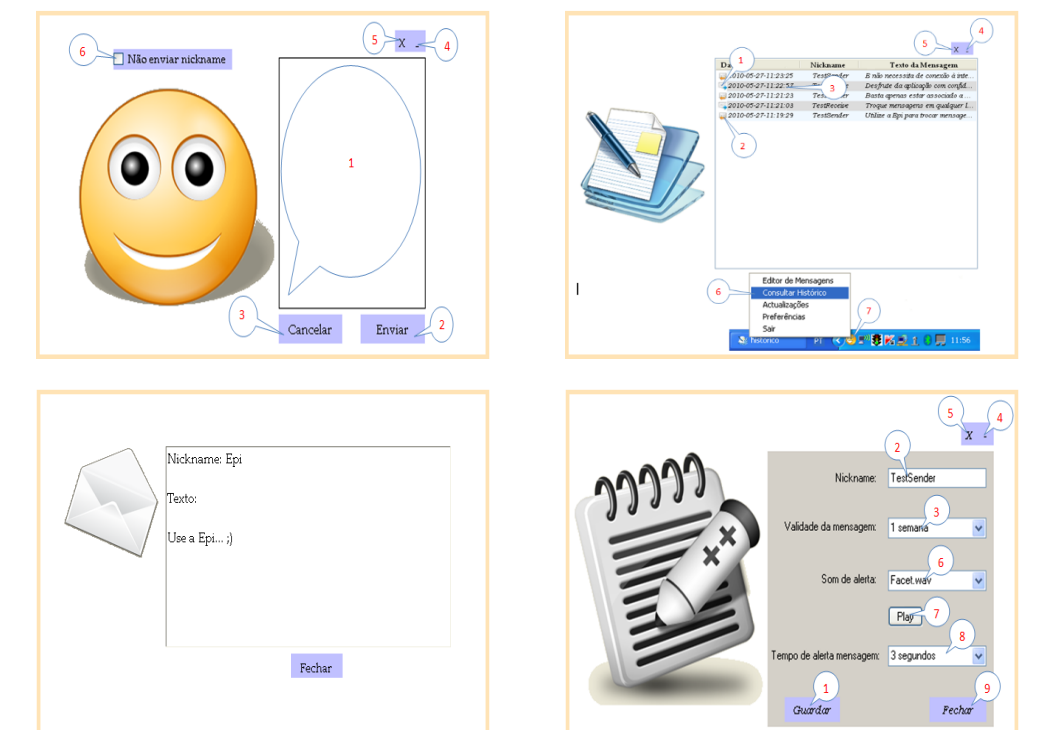
Epi is an application that allows the exchange of messages between the users connected to the same Wi-Fi access point without need of the internet. The messages exchanged in a given location, are stored and distributed again in other places where Epi is used.

Users can use a Wi-Fi network interface to connect to a network in ad-hoc mode; they can even create their own ad-hoc network or can be connected to an access point without having internet access.

Conclusion

The purpose of conducting this article was to demonstrate the importance of using an application that uses the diffusion epidemic as a means of communication, named as Epi (Epidemic diffusion).

Initially we installed the application and we test, so we can draw some conclusions. It was found, as many of the comments made by users on Facebook that this application sometimes did not sent messages and took a lot of time to receive messages sent by others.

Another problem diagnosed and may induce the user to error, is that, in the same infrastructure, may exist several available networks. So, if the users who intend to carry out the exchange of messages are not exactly on the same network, they will never receive the messages of the other user that is in a different network.

Finally, we conclude that this project needs more study and exploration to meet all the needs of the USERS, but we think it can make a positive impact in the future because this is viable.

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