

# The Snow Agent System: A peer-to-peer system for disease surveillance and diagnostic assistance

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## OBJECTIVE

The Norwegian Centre for Telemedicine plans to establish a peer-to-peer based surveillance network between all general practitioners (GPs), laboratories, accident and emergency units, and other relevant health providers and authorities in Northern Norway. This paper briefly describes the architecture and components of the system and the motivation for using this approach.

## BACKGROUND

In the Northern part of Norway, all GPs and hospitals use electronic health record (EHR) systems. They are all connected via an independent secure IP-network called the Norwegian Health Network which enables electronic communication between all institutions involved in disease prevention and healthcare.

## METHODS

The Snow Agent System [1] adopts a third generation data integration approach [2] by using a peer-to-peer architecture combined with a mobile software agent approach. In the Snow Agent System data are extracted directly from the source systems (lab and electronic health record (EHR) systems) by distributing queries among the participants, based on a specification of the geographical coverage of the queries. The system is based on extensions to the open source jabber instant messaging [3] server which enables communication of messages, presence, text conferencing and traditional request reply call semantics similar to the HTTP protocol.

## RESULTS

By using the approach described above we hope to achieve the following; 1) Provide participants with online access to epidemiological data about the local patient population by using the EHR and lab systems as a shared data repository, 2) provide GPs with functionality for a more automated reporting of notifiable cases, 3) provide participants with access to data about antibiotic resistance from the Norwegian antibiotic resistance surveillance system, 4) provide participants with online access to information generated by the food safety authority, and 5) provide partici-

pants with a text conferencing tool for immediate notifications from participants in the system as the food safety authority, laboratory and local health authority involved in infectious disease surveillance and prevention.

An important difference from the traditional approach to disease surveillance is that incidence data is extracted, classified and made anonymous at each peer providing incidence data. This reduces the privacy issues involved. Another difference is that data extracted from the participant or generated by the system not necessarily need to be stored in a centralized server. Each participant is responsible for their own data. This approach may ease deployment and collaboration among the institutions involved.

## CONCLUSIONS

Two main design guidelines have motivated the choice of architecture and choice of components in the system. 1) Surveillance and emergency response systems must be in regular use to work in an emergency situation [4], 2) the participants must have some benefit from participating and using the system. The second guideline is well known and accepted in the disease surveillance community. By providing data that may be of assistance in the diagnosis process we hope to achieve a broad distribution and a sustainable and regular use of the system among the GPs.

## REFERENCES

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