



SpeechMagic Solution Builder

Nuance speech recognition with caching technology:
Flexible and fast - and central

In the course of migrating to a new hospital information system, the speech recognition solutions at the three sites of the Evangelische Stiftung Augusta hospitals, Germany, were consolidated. The transition to SpeechMagic Solution Builder 2.0, the speech recognition workflow solution by Nuance, provided an opportunity to set up a cross-site speech recognition platform with 350 currently active users. In order to relieve the network connection between the sites and to make work faster and more efficient, Nuance installed a cache server.

The Evangelische Stiftung Augusta consists of three sites; the main site is the Augusta-Kranken-Anstalt in Bochum-Mitte with 486 beds; the Evangelische Krankenhaus Hattingen has another 264 beds, and the Bochum-Linden hospital, which focuses on geriatric medicine, has 51 beds. „In terms of speech recognition, we were up to now dealing with a grown structure, typically consisting of a high number of small isolated applications within the individual departments”, says Andreas Kaysler, head of IT at the Augusta-Kranken-Anstalt.

Actually, a general speech recognition campus licence, for MBS-easy (as it was at the time) had been available since 2005. However, some systems were more up-to-date than others, depending on the time of their installation, and on the whole, speech recognition was only partly integrated in the hospital information system. “When the change to another HIS was inevitable, we decided to seize the opportunity and to finally take speech recognition to a common, cross-site platform”, says Kaysler.

Central speech recognition, on-site language profiles

However, there was a problem: with 350 users, the speech recognition system in Bochum is rather large, and the cross-site network has a somewhat limited transfer rate. The data processing centre, which is situated at the main Bochum-Mitte site, and the two other sites are connected via a radio relay link with a capacity of 100Mbit/s.

Highlights

- Cross-site availability of SpeechMagic Solution Builder 2.0 with 350 active users
- Speech recognition integrated in the new HIS medico//s by Siemens via ODSI interface
- A cache server to relieve the network connecting the three sites and allow fast and efficient work
- The solution fulfills all requirements of everyday clinical documentation
- Faster availability of doctor's letters and reports

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Andreas Kaysler, head of IT
at the Evangelische Stiftung Augusta

Since Bochum-Linden is not within reach of the main site, all Bochum-Linden data is routed via Hattingen hospital; as a result, the transmission path between Bochum-Mitte and Hattingen bears the network load for both.

We introduced the radio network four years ago, because back then it provided the best cost-benefit ratio, says Kaysler. The sites use a conventional 1 Gbit/s ethernet. The difficult thing about this setup was that in a centralised speech recognition platform, the users' individual language profiles had to be loaded from the cross-site radio network. "The network quickly reaches its limits, especially during peak times; as the Nuance team ably demonstrated with an impressive model calculation", Kaysler adds.

Judging from the model calculation's figures (see page 3), it became obvious that, at least for everyday business, the language profiles had to be kept locally, so that doctors would not have to endure unnecessary delays.

Nuance therefore proposed installing a cache server, a new feature which was introduced with SpeechMagic Solution Builder 2.0.

"The cache server is an excellent facility which keeps the landline free from network traffic, while still enjoying the benefits of a common, cross-site platform for speech recognition."

Actually, the principle of the Bochum cache server is very simple: The central data processing centre of the Augusta-Kranken-Anstalt at the Bochum-Mitte site provides the main speech recognition server. In addition, there is a cache server at the Bochum-Linden hospital which hosts copies of the acoustic reference files (language profiles) created for the individual users. These copies form the basis for frontend speech recognition, which is used by the majority of doctors in Bochum. Or, in other words: doctors who use frontend speech recognition, at the Bochum-Linden hospital, do not load their profiles from the data processing centre at Bochum Mitte, but from the local cache server on-site. During the night, the profiles from the cache server are synchronized with the original profiles from the main data processing center in Bochum-Mitte, so that all users, at all times, have the most up-to-date language profiles available.

Setup completed in half a day

"To us, setting up a cache server was the logical solution in the given network situation. The cache server is an excellent way to keep the landline free from network traffic, while still enjoying the benefits of a common, cross-site speech recognition platform", explains Kaysler. To optimize the installation further, the cache server has been moved from the Linden hospital to the Evangelische Krankenhaus Hattingen.

“In retrospect, I cannot think of a single aspect of the project that I would have handled differently.”

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“Because the Hattingen hospital is so much bigger, there are simply more users there. Therefore it makes perfect sense to store the copies of the language profiles at that site. The doctors in Linden use the radio link to access the Hattingen server.

Kaysler is especially pleased by how smooth the introduction of the speech recognition platform was, despite the additional installation of the cache server. Installing the cache server took only half a day. In retrospect, I cannot think of a single aspect of the project that I would have handled differently.

In mere technical terms, the first step of the process was to install speech recognition on the new server. Then we had to dedicate this machine as the secondary cache server. In addition we had to define the order the clients call the servers. And that was that.”

During the four weeks prior to launching the cache server, the speech recognition system was homogenised in all hospital departments; finally, Nuance SpeechMagic Solution Builder 2.0 was available everywhere and the new HIS, medico//s by Siemens, was integrated via ODSI interface. “During this time, speech recognition was always available and ready to use at any time”, says Kaysler. “Due to new functionalities in medico//s, we were

Network situation when using speech recognition

When loading speech recognition profiles for frontend speech recognition, 60 MB of data per workstation are transferred with the first user logon, and then each additional logon uses another 40 MB. Therefore a network with a transmission capacity of 100 Mbit/s is busy for a full two minutes, if, for example in the morning, 20 users log on simultaneously. As a result, the initial startup time increases to 1.5 minutes; an unacceptable situation for most doctors.

Yet results become really bad with a 10 MBit/s network, as Nuance staff were able to show in well calculated use case: Assuming that there are 100 users who use frontend recognition 75% of the time, startup times, with 50 loaded profiles and 100 profile updates per day (because users move around as part of their everyday work), can increase to up to 30 minutes.

Yet when using a cache server, the startup times remain the same, since the “bottleneck” of the 10 MBit/s network is by-passed when loading profiles.

also able to optimize the integration of frontend speech recognition.”

Beneficial for users and hospital management

The Evangelische Stiftung Augusta has benefited in various ways from switching to a cross-site platform and using a cache server. Kaysler is especially pleased with the resulting cost development: The costs for the cache server are less than 5,000 euro. At the moment, we still use a normal PC as cache server, and that works as well.” In any case, the alternatives – to extend the radio link or to switch to a cable network with higher speed – would have been much more expensive. That wouldn’t have made any sense at all, says Kaysler.

Users also benefited strongly from the new solution. The doctors who dictate have the extended functionalities offered by Nuance SpeechMagic Solution Builder 2.0 at their disposal; instead of complete documents, they can also dictate text modules, which can then later on be assembled to form the final document. And it is possible to jump between text fields via voice commands, an extremely useful feature for a doctor’s daily work. In total, structured text input has been significantly improved, says Kaysler.

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Thanks to the cache server, the solution is now fast and flexible enough to fulfill all the requirements for everyday clinical documentation. The Bochum surgeons, for example, dictate the patient records immediately, during their consultation hours.

Since treatment rooms and attending doctors change quickly in an out-patient department, it is absolutely essential to provide different language profiles at the various work places on short-term notice and with very little delay. "Via radio link, loading the speech recognition profiles would take far too long. Because we keep the language profiles locally, we can provide the necessary speed and flexibility, without having to do without the advantages of a cross-site platform, says Kaysler.

The advantages of a cross-site platform are crucial for the Augusta-Kranken-Anstalt: young doctors normally use SpeechMagic Solution Builder 2.0 as a frontend speech recognition application. As a result, doctor's letters and reports are available almost immediately. And thanks to the new platform structure, dictations by doctors who use speech recognition as a backend (i.e. offline) system, can be freely transferred between the individual hospital sites. "If, in the past, one transcriptionist was on holiday and the other ill at the Linden site, the senior physician had to write and correct his own reports. Today, the dictation is transferred to a shared typing pool and can be worked on at other sites", says Kaysler. In total, Bochum has significantly less demand for transcriptionists: "Since 2006, we have decreased our transcription service from 14 to two employees; the former transcriptionists can now pursue other, more rewarding tasks in our hospital."