Supporting Real-Time Problem Resolution via
Just-in-Time Collaboration with Experts

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ABSTRACT
In this position paper, we discuss the use of a collaboration tool embedded into a portal for Server System Administrators (“Sys Admins” or “SAs”). The tool uses Lotus Sametime, an enterprise instant messaging client, to connect a SA working on a problem ticket to other SAs who have successfully closed similar tickets. It is increasingly the case that SAs are called upon to manage servers anywhere in the world, and with most SAs working from their homes they no longer belong to teams with clearly defined teammates. SAs therefore have a need to identify and connect with colleagues in real-time, with whom they may have never before interacted, but who have just the right expertise to help them with their current problem.

INTRODUCTION
As large organizations become more and more geographically distributed, the quest for successfully enabling expertise sharing among people who have never met each other, and most likely never will, intensifies. Over the years many such solutions have been developed and experimented with, including the development of large databases of questions with associated answers (e.g. [1]), forums, list servers, and chat systems that distribute a message to a group of people with a registered interest in the topic (e.g. [4]). People who work for a large organization will often say that what enables them to be successful is the fact that they have developed a network of associates, and know whom to call when they have a question. But what happens when somebody is new, and doesn’t have a network to call on, or when you don’t know who within your network might be able to answer your question, and you don’t want to spam everybody with your disruption? These are the situations that we attempt to address by embedding a synchronous collaboration application into a portal for System Administrators that recommends colleagues that the Sys Admin can chat with, who have worked on and solved similar problems.

Sys Admins are a group of workers charged with configuring, administering, trouble-shooting, and maintaining groups of servers. More broadly, Sys Admins can administer networks, databases, web servers and even applications. Although the application we have developed has OS-level admins as its primary user base (i.e. admins responsible for servers, including the operating systems, security systems and infrastructure), we believe it would be useful for all types of admins since they spend an enormous amount of time collaborating. According to an IBM internal costing study, as much as 30% of an admin’s time is taken up in troubleshooting. Of this 30%, up to 90%, involves collaboration [2]. Inefficient collaboration results when a problem gets passed from one person trying to help to another, to another. The idea of our just-in-time collaboration tool is to minimize this inefficiency.

SCENARIO
The use case which motivated the development of our just-in-time collaboration technology was the following: a SA is having difficulty solving a particular problem to which they are assigned and would like to see how similar problem tickets were resolved. Our first pass at satisfying this use case was simply to ask the Sys Admin to enter their problem ticket number, and select a “Find Similar Tickets” option. The system identifies similar tickets, based on a simple text comparison with special weighting given to identifiable system management terms (e.g. server names, patch names/levels) and displays the results in a list. When the user selects a ticket in the resulting list, the ticket details are displayed, including a sometime voluminous log of what was done to solve the problem, ticket creation and close dates, and a list of people who worked on the ticket.

While the above solution satisfied many SAs, we found that there are a significant number of SAs who do not have the patience to sift through many problem tickets to discover precisely how a ticket has been resolved – these SAs would prefer to immediately have access to knowledgeable SAs via a chat session, email or phone. Hence, in subsequent development we created functionality to identify the SAs who solved similar problems, and when displaying the list of similar tickets, we simultaneously show a list of the most successful SAs for the particular problem type, along with their instant messaging status and email address. The program first weights problem tickets according to how similar it believes they are to the problem at hand, and then for each potential “expert,” sums the weights of problems they have resolved to arrive at an expertise rating. When identifying experts, the program has a slight bias towards
functionality. With one click the user can initiate an instant messaging (i.e. chat) session with the identified expert, whether or not this person was previously known to them.

DESIGN AND IMPLEMENTATION
Given the goals of speeding up resolution times and minimizing the cumulative time of all admins needed to solve a particular problem, two questions arise: 1) how do we surface the names of people with the ability to answer a specific question, and 2) once we identify these people, how do we design a system with sufficient mechanisms for safeguarding their time such that they do not become immediately overwhelmed. Our solution, called BlueReach, attempts to address both of those questions.

We built BlueReach on top of Lotus Sametime since Sametime is an instant messaging interface that is already widely used throughout the corporation. We wanted the solution to be something that would be available without the need to locate or install any additional software. Also, we wanted the dialog and question-answering to be synchronous since the asynchronous methods of forums have already been explored, with most results indicating that the ability to get an answer immediately and to have the opportunity to refine the question through dialog [3] are valuable additions to asynchronous forums.

In the just-in-time collaboration system, experts are displayed along with the relevant tickets that they have solved. Experts control when they are ‘visible’ in the system in one of several ways. They can define ‘office hours’, which are set times of the day, and days of the week, when they want to be visible and shown as available to answer questions. Alternatively, the expert can spontaneously decide to be “open for chatting” by so-indicating to BlueReach. Experts are listed with their current Sametime status (active or away) which is displayed as either a green square or a yellow diamond icon next to their name. If the person manually switches himself to Do Not Disturb, they are automatically removed from the list of BlueReach experts even if the current time corresponds to their normal office hours. Additionally, experts can define how many simultaneous chat sessions they will take.

The user selects a person to chat with by clicking on his/her name, and a 3-way chat is launched. The third party in the chat is a BlueReach bot, which initiates the session by sending invitations to each of the participants and records their interactions in a database on the BlueReach server.

FIELD DEPLOYMENT AND DISCUSSION
Field deployment of the BlueReach just-in-time collaboration tool has just begun and there is not yet sufficient data to suggest the degree to which the functionality is being used, or its effectiveness. Users are universally excited by this functionality when it is demoed and education sessions are given to educate SAs on its functionality.

We intend to examine how often BlueReach is used as a function of how precisely the system can determine appropriate experts. Additional new functionality is also planned. First, in the context of problem determination, the chat initiator will be given the option of displaying problem description automatically into the chat session, to help give the expert context. BlueReach functionality will also be offered in a more limited context - any time an SA is looking at a ticket, along with a list of people who have worked on the ticket, each user’s instant messaging status will be displayed, together with the same one-click ability to start up a chat session.

Future versions of BlueReach will include some degree of recommendation. Currently, both the information-seeker and the information-provider have the option of rating the interaction at the end of their chat session. We envision a system that uses that data for making suggestions of pairings. For example, if both parties rated the interaction highly in the past, the expert may be suggested to the question-asker as his/her first choice for asking a subsequent question. The alternative is true as well, in that we would not want to pair up a information-seeker and an information-provider that had a negative interaction previously.

Lastly, we will be including an economy in BlueReach to help with the exchange of information. As such, SAs will be allocated a certain number of points that they can ‘spend’ by asking questions. Questions that have more riding on them, or are more urgent, may have more points associated with them. A recommender system could use information from information-providers to pair up a question with an expert. For example, some experts may not be willing to answer any questions that have less than a 20 point value. We envision that information-providers may also be information-seekers, so they could use accumulated points for getting questions of their own answered.

REFERENCES