

Project Management and the World Wide Web

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Bellcore has created an experimental "virtual project office" web site on the World Wide Web (WWW) for interactive project management of the Internetwork Interoperability Test Plan (IITP) program. IITP is unique in that project team members and labs are from various companies within the telecommunications industry, are geographically dispersed over the United States and Canada and use varied computing platforms. Project management tasks such as effective change control, communication of project information, and forging strong team spirit are particularly challenging in this environment. This virtual project office is an attempt at using the WWW to overcome these obstacles and create a space where project team members can gather to bond and exchange timely project information. This paper discusses the challenges and presents Bellcore's solution and experiences with it.

The Challenge

The Internetwork Interoperability Test Plan (IITP) renders telecommunications service providers and suppliers a cooperative environment for testing their network hardware and software safely with that of interconnected networks. As many as one dozen laboratories scattered about the US and Canada are temporarily connected to each other to form a continent-size laboratory through Bellcore's Interoperability HUB in New Jersey. For each test period--typically three a year lasting 6 weeks each--Bellcore serves as the Project Manager, monitors the connections, collects and distributes data.

There are many challenging factors from a project management perspective:

- Budgets, personnel, and laboratories belong to various companies
- The various laboratories use a mix of computer hardware platforms, application software and test equipment
- Team makeup and laboratories change from test period to test period
- Team members may never meet each other; they generally communicate over the phone
- A large amount of configuration information needs to be shared and understood
- Much of the information is proprietary to one or more of the participants and must be protected

Team-building and communication tools such as a real project office and war room are impractical in this environment because of the physical separation. Collaborative project planning--building a work breakdown structure or risk management plan, for instance--is costly, requiring travel and face-to-face meetings. Quality and progress management are hindered by communications barriers. All of this drives up project risk and cost.

The Solution

Environment

Information presentation and interactivity has essentially been standardized as a product of the almost ubiquitous proliferation of WWW browsers. It almost doesn't matter to the user what hardware platform or application software information is

0-7803-3552-X/96/\$5.00 © 1996 IEEE

resident on. Hyperlinks add to the ease of navigating from information point to information point.

Popular WWW technology supports traditional areas of project management at the IITP Web Site, especially Quality, Time, Risk, Human Resources, and Communications management. It is an evolving virtual project office where project members can meet and conduct project activities. It provides security where necessary and it is intuitive to use.

The IITP Web Site is modeled after the office of a sufficiently-funded project (Figure). It consists of a reception area, cubicles for project team members, a War Room, a library, and a pantry.

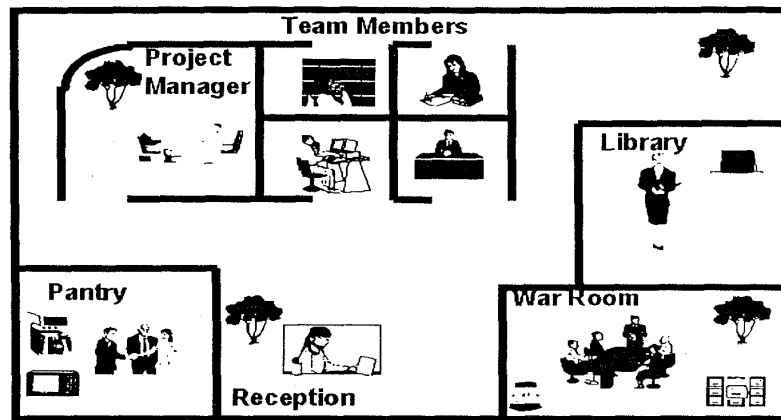


Figure: A Project Office

The reception area is accessible to anyone on the WWW and provides visitors with general information about the IITP such as its mission, background, meeting dates and location. Non-secure documents such as publicly-released reports can be freely downloaded in various application formats or browsed directly in Hyper-Text Markup Language (HTML). The reception area serves as a gate to the rest of the site.

Cubicles provide private workspaces for each of the team members where sensitive communication can occur between the team member and the project manager. A team member's project files can be securely stored and exchanged with the project manager. Sensitive documents contained within cubicles can be given expiration dates, at which time they will be permanently removed. Entry to a cubicle is permitted only to the designated team member and the project manager and is secured with a user ID and Bellcore's S/KEY™ Password Identification System.¹ Transmission of the information from the Web Site to the team member's actual workstation can be encrypted and for the most sensitive documents the actual source files can be encrypted such that only the intended recipient can decrypt and read them.

Team members and the project manager can gather in the War Room to collaborate on project efforts. It also serves as a repository for common project information, e.g., schedules, plans, records, status reports, mailing lists, etc. Entry to the War Room is permitted only to the designated team members and the project manager and is secured with user IDs and Bellcore's S/KEY Password Identification System. Sensitive documents contained within the War Room can be given expiration dates, at which time they will be permanently removed. Transmission of the information from the Web Site to the team members' actual workstations can be encrypted and for the most

¹ S/KEY is a trademark of Bellcore

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Supporting references such as Bellcore Generic Requirements, American National Standards Institute (ANSI)/Alliance for Telecommunications Industry Solutions (ATIS) Committee T1 standards, etc. can be accessed through the Library, a set of hyperlinks to the document ordering pages of the appropriate parties. Visitors looking for a reference document need only visit the library to link to the relevant site. The library is open to the general public and is not a secure area.

The office coffee pot often serves as a place where important but informal project communication occurs, and team members bond through casual conversation. The pantry has been built in the virtual project office to house the coffee pot. Informal communication is supported by a bulletin-board system for non-real time communication. Entry to the pantry is permitted only to team members and the project manager and is secured with a user ID and Bellcore's S/KEY(TM) Password Identification System. Late-working team members can click on the microwave oven for access to the menus of local restaurants with delivery service.

Additional Functionality

In some instances, team members need to communicate standard information to other team members. For example, test anomaly reports need to be submitted to the technical writer in a standard fashion to facilitate generation of a final report. In cases such as this, users are presented with a form to complete and the form is submitted electronically to the appropriate party.

In the past, the only team member that could view test data in real time was the tester located in Bellcore's HUB. A War Room feature allows those present in the room to view real-time test data simultaneously. This improves quality since more eyes can scrutinize the data.

Experience

The IITP Web Site described here is currently undergoing beta test; it is expected to be rolled out in September, 1996. The first generation IITP Web Site located at <http://carin.bellcore.com:3333> is accessible to anyone on the WWW and provides visitors with general information about the IITP such as its mission, background, meeting dates and location. Publicly-released reports from previous tests can be freely downloaded in various application formats or browsed directly in Hyper-Text Markup Language (HTML).

Experience with the first-generation IITP Web Site is very positive. Some IITP member companies have built links to the IITP site into their intranet pages so that company employees can access the reports directly. This has helped them to address issues more quickly and cost-effectively. We have experienced over 500 hits from all over the world on the Web Site since it was launched in February, 1996.

Conclusion

Management of a geographically scattered Project Team is a challenge under the best conditions. The WWW and its ease-of-use has provided an opportunity to bring the dispersed team together under one virtual roof.