Hammer CallMaster™
Single Integrated Environment For Development, Debug, Scheduling and Reporting of Hammer Test Scripts

Overview
Hammer CallMaster is a sophisticated application used for test development, debug, scheduling and reporting across the entire testing life cycle. Test scripts for the Hammer Test System are automatically created from a call flow diagram (Fig. 1). A patented path generation technology can be used to find all paths thru the diagram for comprehensive feature or regression testing, or to simply create scripts from user specified paths for load test or ongoing management.

Once the scripts are created, they can be remotely debugged from a CallMaster client. Remote audio makes it possible to also remotely debug vocabularies and to listen to the voice application as the test script is running. This makes it possible for developers to work from their desk, and have their Hammer in a separate lab.

Load test scenarios are easily defined by specifying the mix of scripts and their ramp profiles. Hammer CallMaster also lets you distribute these scripts across multiple remote Hammers. A broad range of reports is automatically created to provide detailed summaries of failure rates and performance for any step in the call flow as function of call volume.

The same scripts developed in Hammer CallMaster for feature and load test can then also be used directly for management on the OneSight™ for Contact Centers Voice Management System. The scripts automatically store and write the test results such that performance and failure data can be accessed anytime, anywhere via the available OneSight Web interface.

Comprehensive Feature Test Capability
For IVR development and QA testing groups who want to deploy new applications faster and at higher levels of quality, Hammer CallMaster provides a fully automated testing solution that reduces test design, development and execution time by up to 90% while assuring 100% test coverage. Unlike manual test design and execution, which is tedious, unreliable and time consuming, our solution automatically generates and executes comprehensive feature tests from a call flow diagram, reducing test development time from weeks to days. This solution makes it practical to thoroughly test every new and modified IVR application prior to deployment.

Comprehensive Test Coverage
Call flow diagrams are created using Hammer CallMaster’s graphical call flow editor in conjunction with a standard library of call flow icons (Fig. 1). Each call flow icon contains the Hammer Visual Basic code necessary to execute the call flow action and an appropriate set of default telephony parameters. These parameters can be overridden on either a global or instance basis. Users then specify data that is to be used for the tests. The database can be defined separately in Hammer CallMaster or linked to a separate database.

Once the call flow diagram is created, Hammer CallMaster’s Automatic Test Generator uses a highly efficient algorithm to find an optimal set of test paths through the call flow diagram. The generated test scripts cover all call flow icons and all data at least once. In addition, a brief textual description of each test is produced for review, documentation, or manual test execution purposes.

Figure 1. Hammer CallMaster automatically generates Hammer test scripts from a call flow diagram. Icons are picked and placed from palette of standard or custom icons.
As requirements change or new features are added, CallMaster ensures that regression test scripts can be rebuilt in minutes, guaranteeing that new application elements won’t conflict with existing features.

**Leverage Feature Test Scripts for Load Test and Ongoing Performance Management**

Any of the scripts developed for feature testing can be used directly for load testing or ongoing management. Alternatively, users can specify specific paths in the call flow diagram that represent the high volume paths through the application under test and generate a suite of load test scripts for these designated paths. Users can then define the relative mix of call volume that the Hammer will generate for each path. For example, a banking application might have 50% of the load test calls going down an account balance path, 30% doing accounts transfer, and 20% checking current rates. Once the mix is set, users can then easily specify the load ramp profile. While the test runs, data is automatically collected for easy recall and available in a variety of different reports.

The same scripts developed for testing can also be used for management. Users can also specify specific paths for scripts in the call flow diagram and then generate a specific suite of ongoing management scripts. Having a single call flow diagram for generating feature, regression, load and management test suites greatly simplifies the maintenance of scripts. If any application changes, users simply edit the call flow diagram once and then automatically re-generate all the test suites. These scripts automatically format and store the resulting test data so that it can be displayed in real-time with the available Web interface included as part of OneSight for Contact Centers.

**Automated Reporting**

Hammer CallMaster has a broad range of built-in reports for both testing and management.

![Figure 2. Hammer CallMaster automatically generates a broad range of reports. This example shows response time as function of incoming call rate during a load test](image)

These include failure summaries, failure type distributions, trending charts of key performance parameters over time, graphical correlation that show both failure rate and response time for any step in a call flow as function of call volume, and many more. A typical load test report showing response time as a function of call rate is shown in Fig. 2.

**Remote Test Development**

Hammer CallMaster provides a distributed architecture that enables development, run time control, access to failure data and report generation from remote clients that can be anywhere on a company’s network. The system requirements are as follows:

**CallMaster Client**
- Processor: Pentium Pro 800MHz
- RAM: 256 MB
- Available disk space: 150 MB
- Windows XP/2000/NT

**CallMaster Server**
- Pentium III/IV, 1 GHz or more processor
- 1 GB RAM
- Windows 2000 Pro (or Server) w/SP3
- SQL Server 2000 SP2 – Standard Edition
- 30 GB available disk space, including 1 GB on the system drive. 60 GB recommended for management applications

**Hammer Voice Transaction Engine**
- Provided turn-key from Empirix

This approach enables broad access to the Hammer Test System without needing to sit physically at the machine.