

COMMONWEALTH OF MASSACHUSETTS

SUFFOLK, ss.

SUPERIOR COURT DEPARTMENT
OF THE TRIAL COURT

JENZABAR, INC., LING CHAI, and
ROBERT A MAGINN, JR.,

Plaintiffs,

v.

LONG BOW GROUP, INC.,

Defendant.

CIVIL ACTION NO. 07-2075-H

AFFIDAVIT OF FRANK FARANCE

I, Frank Farance, under oath, depose and state as follows:

1. I am a principal with Farance Inc., an information and communications technologies consulting company based in New York, New York. I am submitting this affidavit on behalf of the plaintiffs Jenzabar, Inc., Robert A. Maginn, Jr. and Ling Chai (collectively referred to as "Jenzabar") in opposition to the motion of Long Bow Group, Inc. ("LB") for summary judgment. The statements and information in this affidavit are based upon personal knowledge, my analysis of the information obtained in discovery in this action, and my 30+ years of experience as a software architect, developer, and engineer.
2. As set forth in greater detail below, it is my opinion that (i) LB's incorporation of Jenzabar's mark, both as a keyword meta-tag and a title tag is a primary reason for which LB's site ranks so high on search engine results of "jenzabar", (ii) LB expended considerably more effort in determining the content of the keyword meta-tags (Jenzabar, Jenzabar.com, Jenzabar.net) for the Jenzabar related pages, than other pages on it site, (iii) based on records produced by LB's webhost, there were 607 visitors to LB's site between June-August, 2009 who came as a result of a search for "jenzabar", and (iv) of the page views of the Jenzabar related pages on LB's site during the June-August, 2009 period, there were 619 from education-specific domains, of which 173 involved unique education specific domains associated with colleges and universities.

BACKGROUND AND QUALIFICATIONS

3. I received my bachelor of science in computer science from Yale University in 1980. I have worked continuously since then in the fields of software engineering and information technology. In 1981 I founded Farance, Inc., firm that provides technical and consulting expertise to create, analyze, architect, design, and develop world-class enterprise solutions. With a staff of 15 engineers and support personnel, we have special expertise in, among other things, systems architecture and engineering, commercialization and management, and applications and business systems, such as electronic commerce and financial applications.
4. As a software engineer with more than thirty years of working experience, I have written over one million lines of original code and ported more than ten million lines of code. I have been involved in project management for major companies, including IBM and AT&T, and software architecture for large-scale, real-time distributed information systems for clients such as Dow Jones, Amtrak, and the United States Army.
5. My past projects include, among many others, Barnes and Noble (auditing of E-commerce web logs), Pernod-Ricard brands (Chivas, Seagrams, Glenlivet, Stolichnaya, etc.), Anchor-Blue (West Coast apparel retailer), Fast Capital (financial entity with several branded subsidiaries), all of which involved search engine optimization for their respective web-based content and services. In addition:
 - ◆ Chief architect, designer, and developer for a high-performance distributed computing platform for a major financial/information services company. Developed data abstraction, process abstraction, and communication services to run on multiple operating systems (UNIX, OS/2, Windows NT, MS-DOS) and communication systems (LAN, MAN, WAN, dedicated/switched access). Developed a 4GL and embedded 3GL application language (features of C, APL2, Common LISP).
 - ◆ Architected, designed, and implemented a new computer system for agency operations for a major New York financial/insurance company. The system transitioned the field workforce to use laptop computers for all agency operations.
 - ◆ Designed and built line management and system software for a data communications network controller for a combined voice/data communications network for New York Telephone.

- ◆ Developed the Learning Technology Systems Architecture (LTSA) which is being standardized in ISO/IEC JTC1 SC36 and in IEEE 1484.1. The LTSA has been incorporated or referenced in hundreds of learning technology organizations.
 - ◆ Designed and developed a hospital patient record-keeping and patient severity grading system, used by insurance companies and doctors to manage costs.
 - ◆ Developed Metadata Registry for automated command/control applications for international coalition forces, including tools that support automated translation for different languages/cultures/doctrines.
6. In addition to work for clients, I am and have been extensively involved in international standards-setting bodies since the earliest days of the Internet, including:
- ◆ I am a member of the Executive Board of the InterNational Committee for Information Technology Standards (INCITS), a 40+ year old, accredited standards development organization that covers broad areas of information technology standardization, and whose members include Google, Microsoft, IBM, Adobe Systems, and agencies of the United States government. A list of the Executive Board is attached as Exhibit B.
 - ◆ I have been a member of ANSI (American National Standards Institute), Information Infrastructure Standards Panel (IISP). ANSI is a federation of standards development organizations in the US. The IISP identifies standards needs for the national and global information infrastructure. My work on the IISP has involved networks, nomadicity, distributed systems, security, applications, devices (appliances), electronic publications, education, entertainment, electronic commerce. I have developed or collaborated on developing approximately 30% of the IISP standards needs, including:
 - Security framework and security standards needs: [IISP/97-0257](#)
 - Nomadicity needs, Executive Summary: [IISP/96-0174](#)
 - Nomadicity needs, Rationale: [IISP/96-0175](#)
 - ◆ I have been a member of ISO-IEC JTC/BT-EC - JTC1 Business Team on Electronic Commerce, developing work items for electronic commerce standardization.
 - ◆ I have been a member of ISO-IEC JTC1/SWGGII/JTGII - JTC1 Technical Advisory Group (TAG) on Global Information Infrastructure (GII). This TAG recommends the US position to the Special Working Group on GII. In other words, we're providing advice on how GII issues can be incorporated into standards work and how to coordinate efforts with ITU (International Telecommunications Union, formerly CCITT). We are the project editor for this document. For the latest copy of the GII roadmap, see: <http://ssdo.org/jtc1/gii-roadmap>.
 - ◆ I have been a member of ISO-IEC JTC1 Standards Operations Roundtable (SORT), developing collaboration techniques and the posting of GII-related activities for standards development organizations (accredited standards bodies) and consortia (non-accredited organizations).
 - ◆ I have been a member of the White House Technology Policy Working Group, helping the White House to develop a policy on GII. My paper on US competitiveness and standards

activity was selected for publication on their web site, and can be found at <http://farance.com/papers/tpwg--standards--19970602.pdf>.

- ◆ ISO-IEC JTC1/SC22/WG14 -- C Programming Language Standard. This is commonly known as ANSI C or ISO C. We were the Project Editor for this standard. The ISO (international) web page is at <http://www.open-std.org/jtc1/sc22/wg14/>.
- ◆ ISO-IEC JTC1/SC22/WG11 -- Language Independent Bindings. This committee has developed the Language Independent Arithmetic (LIA), Language Independent Datatypes (LID), and Language Independent Procedure Calls (LIPC). We have been involved in (1) bindings of LIA to the C programming language, and (2) extensions of LID (ISO/IEC 11404) to support semi-structured data, unstructured data, and XML bindings. I am the project editor for the ISO/IEC 11404 standard (now re-titled "General Purpose Datatypes").
- ◆ ISO-IEC JTC1/SC32/WG2 -- Metadata. This committee has developed the metadata registries (ISO/IEC 11179) series of standards. Farance Inc. is developing the ISO/IEC 20944 metadata interoperability binding standards for this committee.

7. Of particular relevance to this case, for the past 6 years I have been engaged to advise and assist the major marketing firms and retailers previously identified (premium liquor brands, regional apparel chains, top-tier book retailers, educational institutions, etc.) in connection with search-engine optimization. "Search engine optimization" is the process by which the owner of a website can affect the content and other attributes of the site in an effort to have the site located and ranked favorably by a search engine such as Google. This work includes analyzing how the use of keywords, title tags and content on their websites, including the use of meta-tags, can be adapted to effect search engine results and rankings by Google, Bing and other similar search engines. Part of my experience includes conducting "campaigns", which are effectively trial experiments under controlled conditions, whereby I would make a series on incremental changes to the content, metatags and other attributes of a site in order to determine how each individual modification affected the specific search engine's results of ranking of the site (as modified).
8. My curriculum vitae is attached as Exhibit A.
9. I occasionally serve as a consulting or testifying expert in litigation, but this work does not constitute the primary focus, or even a significant portion, of my business. Nevertheless, I have been qualified to testify as an expert in the following cases:

(i) Payroll Partnership L.P. v. Rapid Payroll, Inc., et al., Los Angeles County Superior Court (CA), Case No. BC294341 (2004-2005). I was qualified as an expert and testified in the jury trial in a case concerning payroll software systems.

(ii) People of the State of New York v. Stephen Null, New York County Supreme Court (NY), Case No. 2289-2007 (2007-2009). I testified as an expert in this criminal matter concerning a forensic analysis of key electronic evidence.

(iii) Appeal of Business Software Associates, Inc., District of Columbia Contract Appeals Board No. D-1130 (2004). I testified as an expert about industry standards and practices for information technology software vendors.

PROJECT BACKGROUND AND SCOPE OF WORK

10. Jenzabar engaged me (a) to review LB's website, (b) to analyze how LB has designed its website to optimize its placements in search results for the keyword "Jenzabar" and related terms, (c) to identify the ways LB has used Jenzabar's trademarks in the HTML code on the website, and (d) to analyze documents and data produced by Aplus.net ("Aplus"), the company that hosts LB's website, to determine what visitors LB has attracted to its website as a result of its deliberate use of Jenzabar's name and marks.
11. I have reviewed LB's website and the source code for and its use of the terms Jenzabar, Jenzabar.com and Jenzabar.net as keyword meta-tags in the source code for pages on its website, including the following: (i) "About Chai Ling and Jenzabar, Inc." (www.tsquare.tv/film/jenzabar), (ii) "News Accounts" (www.tsquare.tv/film/american_dream), and (iii) "A Summary of Their Lawsuit Against the Long Bow Group" (www.tsquare.tv/film/jenzabar_lawsuit).
12. The source code of LB's website includes "Jenzabar" in the metatags and other metadata. A metatag is an invisible portion of HTML¹ within the header portion² of a web page that provides

¹ HTML stands for Hyper Text Markup Language. HTML is a technique of inserting tags to provide structure, meaning, and presentation information within documents. For example, <P> is inserted to signal the beginning of a paragraph, <I> is inserted to indicate italics, and
 is inserted to cause a hard line break.

² Web pages are divided into two parts: the header (bracketed by <head> and </head>) and the body (bracketed by <body> and </body>). The header provides information and other data about the web page. The body provides the text itself with embedded markup tags.

descriptive data about that web page. The metatag is prefixed with "<meta" and ends with the closing ">".

13. A keyword metatag is of the form "<meta name='keywords' content='xxx yyy zzz'>" when "xxx yyy zzz" are the keywords.³ For example, the following metatag keywords were extracted from the "www.tsquare.tv/film/jenzabar.html" web page in the documents supplied by Aplus:

```
<meta name="keywords" content="Chai Ling, Ling Chai,
Jenzabar, Jenzabar.com, Jenzabar.net, Gate of Heavenly
Peace, Tiananmen Square">
```

14. A description metatag is of the form "<meta name='description' content='xxx yyy zzz'>" when "xxx yyy zzz" is the description of the page. For example, the following metatag description was extracted from the "www.tsquare.tv/film/gateexcerpts.php" web page in the documents supplied by Aplus:

```
<meta name="description" content="This site explores the
history and origins of the 1989 Tiananmen Square protests.
The film and media section provides extensive information
about the documentary, The Gate of Heavenly Peace, along
with a media library containing videos, music, posters, and
stills." />
```

15. A title tag⁴ is part of the header portion of the HTML, begins with "<title>" and ends with "</title>". For example, the following title was extracted from the "www.tsquare.tv/film/jenzabar.html" web page in the documents supplied by Aplus:

```
<title>Jenzabar</title>
```

16. The World Wide Web Consortium (W3C) is the standards setting organization for the web. In its standard for HTML 4.01,⁵ which defines the structure and meaning, of HTML, it explains the purpose of keyword metatags: to help search engines index⁶ web pages.⁷

³ Both "name='keyword'" and "name='keywords'" are equivalent. Keywords can be separated by spaces or commas.

⁴ Some people call the title tag a title metatag (although, technically, this is not correct).

⁵ See "http://www.w3.org/TR/html4/"

B.4 Notes on helping search engines index your Web site

This section provides some simple suggestions that will make your documents more accessible to search engines.

[...]

Provide keywords and descriptions

Some indexing engines look for META elements that define a comma-separated list of keywords/phrases, or that give a short description. Search engines may present these keywords as the result of a search. The value of the name attribute sought by a search engine is not defined by this specification. Consider these examples,

```
<META name="keywords" content="vacation,Greece,sunshine">  
<META name="description" content="Idyllic European vacations">
```

17. In other words, the very purpose of using title tags, meta-tags, and other such descriptive information is to make pages more easily found by internet users using search engines. In this case, my analysis of the source code of the LB websites reveals that LB has deliberately used "Jenzabar" in the metatags, title tags, and other metadata to make its web pages appear more prominently to internet users searching for information about Jenzabar.
18. I am also familiar with the technology used by Web search engines such as Google, Bing, Yahoo, and others. As a general matter, Web search engines work by retrieving and storing information about many web pages. Web search engines use special software robots, called spiders or Web crawlers to "crawl the Web", looking at as many Web sites as possible, following every link on the Web sites they visit, and building lists of the words found in the HTML on the Web sites.
19. The contents of each Web page are then analyzed using an algorithm to determine how the page it should be indexed. For example, words are extracted from the titles, headings, or meta tags. The data about web pages are stored in an index database to be used later in response to user search queries.
20. Different Web search engines use different algorithms that assign different importance to the information on each Web page. Words occurring in the title, subtitles, metatags, and other

⁶ Indexing is similar to the card cataloging process that a librarian uses: the librarian takes the description of the book (title, subject, author, etc.) and puts it in a card catalogue for subsequent search and discovery by a user, while the web search engine takes the description of the web page and puts it in a database for subsequent search and discovery by an internet user.

positions of relative importance are generally noted for special consideration during a subsequent user search.

21. The various Web search engine algorithms generally use a combination of different factors to determine the ranking of a web page in a list of search results. These factors include: (a) the website's domain registration information, (b) the title of the page as set out in the title tag, (c) the description of the page as set out in the "description" metatag, (d) the domain name (including subdomains), (e) the keyword density (i.e., where and how frequently the keyword appears on the page), (f) the freshness of the contents, (g) the number of links to the page from other sites, (h) the text in the links to the page from other sites, (i) the page rank of the pages that link to the site, (j) the links on the page to external web sites, and (k) the total number of pages on the web site.
22. The weight assigned to these factors varies from search engine to search engine, but title tags and metatags are used by every Web search engine to determine search results and ranking.
23. I am aware that in response to a subpoena served in this case, Google submitted an affidavit about how its search engine operates. Google states on its "Technology Overview" page (www.google.com/corporate/tech.html) that page-based text "can be manipulated by site publishers through meta-tags". Further, Google's page, entitled "Webmasters and Site Owners Help" (www.google.com/support/webmasters/bin/answer.py?hl=en&answer=70897), states that with respect to indexing: "we process information included in key content tags and attributes, such as Title tags". Copies of these pages from Google's website are attached at Tab 34.
24. Other search engines (such as Bing, Yahoo, etc.) similarly use title tags and metatags to rank search results.
25. I am further aware that LB's site, www.tsquare.tv/film/jenzabar, appears as the second or third "hit" (under the title tag "Jenzabar") on a Google search of the term "jenzabar", and as the fifth

⁷ Excerpt from "<http://www.w3.org/TR/html4/appendix/notes.html#h-B.4.1.2>"

"hit" under a similar search on Bing. See Tabs 37 and 38. I am even aware that LB's site comes up on the first page of "hits" on a Google search of "jenzabar home page". See Tab 49.

26. Based on the above analysis and my education, research and experience, it is my professional opinion that LB's incorporation of Jenzabar's registered marks, as both keyword meta-tags in the source code for pages on LB's website, together with "JENZABAR" as the title tag, is a primary reason for why Web search engines, including Google, Bing, and others rank LB's website so high on a search of the term "jenzabar".

27. In addition, I have had an opportunity to review the data and documents produced by Aplus.net (in response to a subpoena) regarding the traffic to LB's website during the period of June-August, 2009. (It is my understanding that neither Long Bow, nor Aplus, preserved records or data for periods prior to the past 90 days.) I also have been able to identify the users (based on their internet addresses) who have visited LB's website and their interactions with LB's website during the recent 90 day period. The following is my analysis and the results therefrom.

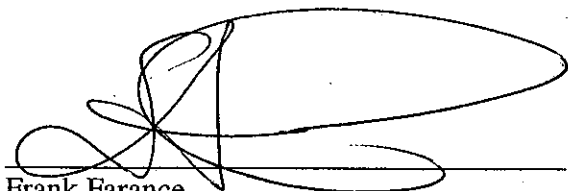
28. I was able to determine that, during the period, there were 607 visitors to LB's site which came as a result of an internet search for "jenzabar". I also reviewed the 90-days of log data in search of the following URLs and their aliases, which pages specifically referenced Jenzabar:

<http://www.tsquare.tv/film/jenzabar.html>
http://www.tsquare.tv/film/american_dreamhtml
http://www.tsquare.tv/film/jenzabar_lawsuit.html
<http://www.tsquare.tv/film/appeal-online.html>
<http://www.tsquare.tv/film/chinese/film/Appeal-Chinese.html>
<http://www.tsquare.tv/film/harvard.html>
http://www.tsquare.tv/film/jenzabar_letters_2007.html
http://www.tsquare.tv/film/internet_quotes.html

29. During that period, there were 9,190 page views on the above pages. A 'page view' is an internet user retrieving a page (e.g., typing in a URL, clicking on a link, selecting a result from a search engine). In some cases, the originating IP address could not be reverse-mapped into the domain name (known as "unresolved"), while the remaining could be reverse mapped (known as "resolved"). There were 1883 unresolved page views and 7307 resolved page views.

30. Of the resolved page views, 619 of them were from education-specific domains (".edu" and ".ac"). The 619 page views involved 173 unique education specific domains, associated with colleges and universities. Attached at Tabs 43 and 44, respectively, are these lists which I compiled from the information provided by Aplus.net. Since Jenzabar's customer base are institutions of higher education, my purpose was to dissect the data and isolate and identify those visitors to the Jenzabar-related pages on Long Bow's website who were associated with colleges and universities.
31. It is also my professional opinion, based upon the above, that Long Bow expended considerably more of an effort in determining the content of the keyword meta-tags on the Jenzabar-related pages on its site because (1) most pages on tsquare.tv have similar descriptive data in the header portion of the HTML, which reflects a lack of cataloging effort that typically results from merely copy-pasting HTML files and changing only the body (visible) portion of the file, (2) of the pages that received more cataloging effort, with the exception of Jenzabar pages in the matter at hand, the keywords themselves were used in the text within the body portion of the HTML, (3) of the Jenzabar pages, extra keywords that highlighted every conceivable machination of "Jenzabar" were included (eg. Jenzabar, Jenzabar.com, Jenzabar.net), even where minimally related to the actual content of the page. For example, the page tsquare.tv/chronology/Deng.html contains the 5 page speech by Chinese Premier Deng Xiaoping entitled "June 9 Speech to Martial Law Units", yet there are no keywords (not even Deng Xiaoping) for the web page. (Tab 51). Meanwhile, on tsquare.tv/film/jenzabar.html, in contrast to Chai Ling and the Jenzabar company, the web addresses jenzabar.com and jenzabar.net are not significant elements of the text -- they are only mentioned once -- yet they are both included as meta-tag keywords in the web page. Clearly, there is a higher degree of effort by Long Bow's webmaster/authors in cataloging the jenzabar-related pages, when compared to the other pages on the tsquare.tv website. As stated above, the purposes of cataloging web pages is to make them more discoverable to search engines, and based upon the difference in effort on cataloging the jenzabar-related pages, Long Bow is intending for the jenzabar-related pages to be better/more discovered via web searches.

SIGNED UNDER THE PAINS AND PENALTIES OF PERJURY THIS ____ DAY OF
NOVEMBER, 2009.



Frank Farance

Curriculum Vitae for Frank Farance

Frank Farance, Farance Inc.

Phone: +1 212 486 4700, Fax: +1 212 759 1605, Cell: +1 800 FARANCE

E-mail: frank@farance.com, http://farance.com

My skills are best described by the following titles (in no particular order):

- **PRODUCT/PROGRAM/PROJECT MANAGER:** Managed many projects at various levels of management. Managed budgets, schedules, customer delivery. Product management for IT products. Worked with very large (Fortune 10), medium, and small companies. I've managed directly/indirectly teams up to 150.
- **SENIOR SOFTWARE ENGINEER:** 30 years experience as a software developer/engineer/architect. All the skills (requirements, analysis, design, coding, testing, integration, packaging) for software development on a wide variety of platforms, environments, and constraints (real-time, nomadic/ wireless). Working knowledge of a variety of methodologies (Yourdon, UML, ...), operating systems (Unix/Solaris/Linux internals >25 years, Windows), languages (C/C++, Java, JavaScript, Perl, Tcl, Yacc, Lex, ...), network protocols (architecture, implementation, troubleshooting; various layer 3, 4, 5, 6, and 7 protocols), codings (XML, HTML, ...), development environments (bug tracking tools, configuration management tools, compiler/build tools). Work well in development teams from 1-500 people.
- **SENIOR SOFTWARE ARCHITECT:** The high-level design for systems, APIs, libraries, applications, etc., so that they integrate efficiently while maintaining the maximum amount of reuse. Very good at developing highly usable application paradigms (e.g., an API) for in-house and third party development. Strong experience in enterprise architecture (information, technology, business).
- **SENIOR SYSTEMS ARCHITECT:** The ability to find common insight across a variety of stakeholders. For ISO (International Organization for Standardization), I was the Project Editor for the Global Information Infrastructure (GII) Roadmap. The GII spans across all information and communication technology industries, such as networks (e.g., Internet), telephony, financial, entertainment, healthcare, education, security, electronic publications, electronic commerce, home electronics, nomadic/ wireless systems, distributed systems, applications, devices (appliances). The GII is probably the biggest architecture project in the world. In other words, I am very good at building consensus across a wide variety of stakeholders and industries.

EXPERIENCE SUMMARY: product management, product planning, project management, systems architecture, systems analysis, systems design, systems testing, teaching, standards development and conformance, software engineering methodology, national/global information infrastructure, computer aided software engineering, distributed computing, multiprocessor and massively parallel systems, operating systems and kernels, language architecture, compilers and interpreters, networking, communications, electronic publications, terminology and terminological applications, financial applications, numeric applications, legal applications, database systems and applications, user interface and usability, educational applications, documentation, maintenance, and expert witness in the field of information technology.

PRODUCT/PROJECT MANAGEMENT:

- Manager and executive for Farance Inc. with staff up to 15 engineers and support staff..
- Principle Investigator for several DoD SBIR (Small Business Innovation and Research) projects. Projects involved hundreds of milestones, a staff of 15-20, and 3-4 years of effort. Our work has received several awards, including the 2000 US Army Quality Award for our innovative work in LTSA and PAPI (see IEEE 1484.1 and IEEE 1484.2 above). We were selected as one of the top three commercialization companies (of thousands) for DoD.
- Leadership/management positions in ISO technical activities (chair of several committees, management responsibilities, secretariat). Requires managing hundreds of people across 50-70 projects at any given time.
- Consultant to IBM AIX Product Management with industry knowledge, marketing techniques, management techniques, and technical knowledge.
- Product Manager and Product Planner for AT&T for C Compilation System for native and cross compilers at AT&T Bell Labs (Holmdel) for WE 32100 and WE 32200 chipsets.
- Due diligence for several venture capital firms. Investigated many companies. Support merger of two public firms.

Curriculum Vitae for Frank Farance

- Fund raising and marketing of startup company for computer-assisted instruction service.
- Fund raising and marketing of startup company for network-wide disk sharing system.

METHODOLOGY:

- Large-scale enterprise architecture for US government entity using Gartner bricks/patterns. Primary author for approximately 300 bricks and patterns on data and related infrastructure for large-scale deployment. Developed capability-maturity methods into improve quality and coherency. To date, largest single effort is US government entity using Gartner enterprise methodology.
- Designed and built configuration management and development tools for life critical, real-time, multi-platform distributed development for train control application (Amtrak/Long Island Railroad, Penn Station, NYC). Developed tools for problem tracking, version control, release control, distributed build, media packaging and generation, forensic analysis. Developed techniques for managing operating system, application, and user configurations.
- Developed intellectual property (IP) analysis tools for system software for IBM's AIX. The tools analyzed ~10,000 software components of mixed IP origin and produce IP breakdown/source so that royalty payments could be made.
- Created development cycle risk analysis and predictive techniques for overlapping development and build cycles for major operating system. Management used these techniques for scheduling/prediction of build/integration for approximately 30,000 modules (4 million lines of code).
- Designed and built CASE methodology for analysis and design that is modeled after traditional code development under version control. Novel application of configuration management to early design/development stages.
- Built a software product development and support environment: (1) a text and binary version control system, (2) a source extraction tool (configuration management), (3) install and update media generation tools, (4) integration with existing problem tracking databases. Tools built via common scripting languages for high portability.
- Software engineering tools: media creation, packaging, and installation modeling tools for IBM's AIX. Tools permit product management to design/package appropriate configurations/bundles, based on customer's needs.

EXPERT WITNESS:

- Expert witness on case involving software development methodologies, code portability, technical aspects of contract interpretation.
- Expert witness on case involving software development methodologies, code portability, operating systems, MS Windows environments, windowing systems, graphical user interfaces.
- Expert witness on case involving off-shore development, software development methodologies, code and application portability, code theft, Java development and application platforms.
- Expert witness on case involving web-based application services and content management systems.
- Expert witness on criminal case involving document forensics.
- Expert witness on case involving forensic analysis of software engineering project management techniques.
- Expert witness on case involving forensic analysis of disk drives and word processing files.
- Expert witness on case involving claims concerning trade secrets and intellectual property theft.

STANDARDS WORK/ INT'L LEADERSHIP/ PUBLIC TECHNOLOGY DEVELOPMENT:

- Member of INCITS Executive Board (International Committee for Information Technology Standards). This is the top-level US committee (of ~25 companies) that represents US positions (internationally) for Information Technology standardization. See "<http://www.incits.org>".
- Project Editor for the ISO C programming language (ISO/IEC JTC1 SC22 WG14). Contributor and member of US delegation to ISO C.
- Chairman of ANSI X3J11.1/DPCE (Data Parallel Extensions to C). Extensions to the C language for numerically intensive and massively parallel applications.
- Liaison/Reviewer for POSIX (UNIX standards) for INCITS J11 (C Programming Language Standard). Included ballot review/commenting: language independent environments, real-time extensions, sockets, networking, locales.
- POSIX, SVVS, and ANSI C conformance testing for IBM's AIX operating system (370 and PC versions).

Curriculum Vitae for Frank Farance

- Contributor to ANSI X3J11.1, Numeric C Extensions Group (NCEG). Most features (IEEE arithmetic, variable length arrays, complex type, aliasing, etc.) were incorporated into the latest revision of ISO C ("C99") standard.
- Chair of ISO/IEC JTC1 SC36, standards for Information Technology for Learning, Education, and Training. Founder of committee. Strong leadership/consensus-building role in international forum. Development of the business plans and administration of standards in learning technology. Strong participation in technical development (collaborative technology, learner information, management/delivery, architecture, terminology). See "<http://jtc1sc36.org>".
- Chair of ISO/IEC JTC1 IIT-RG (Implementing Information Technology Rapporteur Group). Group developed document distribution, development, and asynchronous collaboration techniques for standards development (i.e., collaborative consensus building). Recommendations in use worldwide (see ISO web site: "<http://www.iso.ch/sdis>").
- Project Editor for ISO/IEC JTC1 Special Working Group on Global Information Infrastructure (GII). Cross-industry analysis and roadmap for the GII. Lead architecture in several areas: electronic documents, security, interfaces, nomadic/wireless, data management. See "<http://ssdo.org/jtc1/gii-roadmap>". This work product and the IISP work (below) are the technical framework for global standards. Also, see my paper (below) on "Choosing a GII Architecture".
- Lead architect of ANSI IISP (Information Infrastructure Standards Panel) that developed the standards needs, framework, and architecture of the NII/GII (national/global information infrastructure), also known as the "information superhighway". The IISP is providing guidance to the White House for their Information Infrastructure Task Force (IITF). I've authored, co-authored, or collaborated on over 30% of the GII needs. See "http://web.ansi.org/public/iisp/std_need/needlist.html".
- Member of ANSI IISP architecture working group, standards roundtable, electronic publications task force, and application, networking, and appliance needs groups.
- Co-author of ANSI IISP cross-industry security needs. Developed over 60 security needs in roughly a dozen main areas. Developed high-level security framework that is basis for information and communication technologies security. See "<http://web.ansi.org/public/iisp/docs/97-0257.html>".
- Co-Chair of Electronic Publications Roundtable. Addressed cross-industry needs for electronic publications, electronic documents, digital libraries.
- Chair of Metadata Roundtable. Addressed cross-industry needs for data, metadata, thesauri, digital libraries, document search, knowledge bases.
- Co-Chair of Nomadcity Roundtable. Addressed cross-industry needs for nomadic, wireless, disconnected, and distributed systems. Included focus on telephony, security, databases, users, transportation systems, information technology. See "<http://web.ansi.org/public/iisp/docs/96-0174.html>" (Executive Summary) and "<http://web.ansi.org/public/iisp/docs/96-0175.html>" (Rationale).
- US Head of Delegation for ISO/IEC JTC1 Vocabulary Maintenance Team (VMT). The VMT is responsible for maintaining the 35-part standardized vocabulary on information technology, which includes 5000+ terms.
- US Delegate to ISO/IEC JTC1 Cultural Adaptability Workshop (CAW). Developed a cross-industry, cross-committee strategy for incorporating cultural elements, including: generic cultural adaptability including multi-lingualism, coded character sets and their characteristics, interfaces and interaction between users and systems.
- US Delegate to ISO/IEC JTC1 Business Team on Electronic Commerce (BT-EC). Developed standards work and industry perspective for e-commerce standardization. Work product incorporated into ISO e-commerce standards.
- Technical lead in ISO/IEC JTC1 Standards Operations Roundtable (SORT). Developed collaboration techniques and practices using web and internet technologies. Developed/maintained web site for the posting of GII-related activities for standards development organizations (accredited standards bodies) and consortia (non-accredited organizations).
- US Delegate to Java Study Group (ISO/IEC JTC1 SC22 JSG), standardization activity for Java and JavaScript technologies. Review/standardization of JavaScript (ECMAScript). Improved, internationalized Java string class.
- Contributor to INCITS R1 (real-time services) on real-time extensions to UDI device driver interface.
- Project Editor for revision of ISO/IEC 11404 General Purpose Datatypes (formerly "Language Independent Datatypes") (ISO/IEC JTC1 SC22 WG11). 11404 is basis for W3C XML Schema datatype specs.

Curriculum Vitae for Frank Farance

- US International Representative to Metadata Standards in ISO/IEC JTC1 SC32 WG2 and INCITS L8 (see "<http://metadata-stds.org>"). Contributor to Metadata Registries (MDR* series). Project editor for Metadata Interoperability standards (ISO/IEC 20944, to be published). Project editor for Metadata Modules standard (ISO/IEC 19773, to be published).
- US Head of Delegation for ISO/IEC DIS 29500 Ballot Resolution Meeting for OOXML (Office Open XML) standard.
- US Head of Delegation for ISO/IEC JTC1 SC25 WG1 (Home Electronic Systems) and EIA (Electronic Industries Alliance). Contributor for HomeGate: Architecture for the Residential Gateway (ISO/IEC 15045). HomeGate is the multimedia architecture for the home, home office, or small office.
- Project editor and lead developer for DCTP (Data and Control Transfer Protocol) standard in ISO/IEC JTC1 SC25 WG1. DCTP is a command and control protocol for embedded systems, devices, and appliances in the home.
- Vice Chair of IEEE LTSC (P1484.*), Learning Technology Standards Committee. Co-founder of committee. Substantial contributor to most Working Groups. See "<http://ltsc.ieee.org>".
- Project editor and author of IEEE 1484.1, Learning Technology Systems Architecture (LTSA) Specification. An architecture, specification, and conformance test for the learning technology, computer-based training, and education industries. See "<http://edutool.com/ltsa>". LTSA was adopted by the US DoD (Department of Defense) Joint Technical Architecture (JTA). LTSA has been translated into German, Japanese, Korean, Chinese.
- Project editor and author of IEEE 1484.2, Public and Private Information (PAPI) Specification. Portable student records (personal information and grades). Work developed in collaboration with Educause Instructional Management Systems (IMS) Project and OMG's CORBAMED (healthcare industry). Technology demonstrated at White House on 1998-04-30, part of President Clinton's Educational Initiative. See "<http://edutool.com/papi>". PAPI Learner adopted by the US DoD Joint Technical Architecture (JTA). Standardized in ISO/IEC JTC1 SC36 and SC32.
- Contributor to IEEE 1484.11, Computer Managed Instruction (Learning Management System specifications). Major contributor to API and data model specifications.
- Contributor to IEEE 1484.12, Learning Object Metadata. Developed ISO/IEC 11404 abstract datatype representation in IEEE 1484.12.2. See "<http://edutool.com/lom>".
- Technical Lead and Technical Editor IEEE 1484.13, Simple Human Identifiers (re-titled "Participant Identifiers in ISO standard). See "<http://edutool.com/shi>". Work was adopted as ISO/IEC 21484-13.
- Contributor and Technical Editor for IEEE 1484.14, Semantics and Exchange Bindings. Developed technical reports for generic data extension techniques, rule-based XML bindings, and rule-based DNVP (dotted name-value pair) bindings. See "<http://farance.com/sxb>". Work incorporated into ISO/IEC JTC1 SC32 standards.
- Technical Lead for IEEE 1484.18, Platform and Media Profiles (vendor-independent browser standards). New innovative technique for standardization of browsers. See "<http://farance.com/pmp>" and "<http://jtc1sc36.org/isp>".
- Technical Lead for Profiles in Instructional Management Systems (IMS) Project. IMS is a consortium of universities, institutions, commercial companies, and government. Developed student records interchange formats and protocols. System architecture work.
- Acting Liaison to PCTE (Portable Common Tool Environment) for INCITS J11.
- Liaison to Language Independent Arithmetic, Datatypes, and Procedure Calling standards (ISO JTC1 SC22 WG11).
- Contributor to ANSI X3 AHGM -- Ad Hoc Group on Mechanization. Developed electronic document distribution methods for standards committees.
- Contributor to ANSI X3H5 -- Parallel Computing Forum (PCF) standards committee. Developed "statement-based" and "block-based" parallelism/threading/multiprocessing methods.

OPERATING SYSTEMS, KERNEL ARCHITECTURE, PROGRAMMING LANGUAGES:

User-Space Interface Features

- Built a Shared Library software utility for the UNIX System. The project was described in a paper that I presented at the Winter 1984 UNIX Conference. First public implementation of shared library technologies without compiler modifications. My technique has been incorporated into most modern OS shared library/DLL systems.
- Architecture, analysis, and design of Japanese Kanji text processing system for Sun OS.
- Architecture/prototype of additional multibyte character/language support for IBM's AIX.

Curriculum Vitae for Frank Farance

- Analysis and design of UNIX System V port to 32 bit minicomputer. The port was done as an emulation on top of an existing operating system (Manchester University's MUSS System).

Multiprocessing/Parallelism/Threading

- Multiprocessor port of UNIX Streams I/O subsystem to load balanced, symmetric, multi-CPU hardware on Concurrent Computer (Perkin Elmer) 3280 MPS.
- Analysis and design of supercomputing, multiprocessing, and enhanced swapping and paging techniques for IBM's AIX/370.

Device Drivers

- OS/2 2.0 Workplace Shell (windowing) development, testing, maintenance, and integration.
- IBM 3270 console support for AIX.
- 4-bit plane color graphics support for Sun workstation/operating system. Design of kernel device driver support and interface to Sun Windows graphics system.
- Network-wide disk sharing and CPU load sharing protocol for UNIX systems.

Network/Communications

- Troubleshoot, testing, and improvement of load-balancing network protocol for IBM AIX systems. Worked in laboratory and at customers' sites in the field to make high availability system.
- Network and applications architect for two wide area networks (approx. 3000 nodes each, one TCP/IP, one Novell SPX/IPX) integrating MS-DOS and UNIX.
- Network configuration, analysis, and troubleshooting for many clients.
- Design/implementation of command and control protocols (DCTP, see above).
- Design and port of file transfer protocol for X.21 link.

Embedded Systems

- Remote operating system debugger for multiprocessor system. Supported remote diagnosis (via WAN, LAN, and serial line) for customer support.
- Developed user interface embedded software for digital telephone system.

Languages, Compilers, Interpreters, Translators

- Developed a translation system for automated parsing and interpretation of XML for structured, semi-structured, and unstructured data. This approach is being incorporated into the ISO/IEC 20944 Metadata Interoperability standards.
- Extended the C language to include extended integer range (programmer-defined integer sizes), bit/byte ordering, bit/byte alignment. These features are the basis for the latest revision to the ISO C Standard ("C99").
- Modified C compiler to include COMPLEX and DOUBLE COMPLEX datatypes and for interfacing C to Fortran.
- Built an automated translator from MM/NROFF/TROFF to SGML/XML. The translator was in 10 passes (including 1200 lines of LEX) with a conversion rate of 99.95%.
- Automation of port of network control center software from MS-DOS to SUN IPC in PASCAL and assembler (over 100,000 lines). The port required automatic translation of the Pascal code plus MS-DOS serial port emulation as an Internet daemon under UNIX on a remote Sun Workstation.
- Ported 8086 C Compilation System (including utilities) to UNIX System V 16-bit and 32-bit cross environments (PDP-11 and VAX).
- Analysis, design, and testing of Portable C Compiler port to the minicomputer mentioned in the MUSS project above. Responsibilities included designing and implementing an automated testing system for C compiler verification.
- Built a Fortran 4 Plus to Fortran 77 source code translator for automated porting of Fortran applications.

APPLICATIONS AREAS:

Financial/Insurance

- Chief architect and developer of real-time spreadsheet and trading system driven by the market feeds for a major financial/information services company. Developed overall system architecture, spreadsheet language, spreadsheet tool, technical analysis studies, analytical filters. Developed computation/analysis engine.
- Chief architect, designer, and developer for high-performance, distributed computing platform for a major financial/information services company. Developed data abstraction, process abstraction, and communication services to run on multiple operating systems (UNIX, OS/2, Windows NT, MS-DOS) and communication systems (LAN, MAN,

Curriculum Vitae for Frank Farance

WAN, dedicated/switched access). Developed a 4GL and embedded 3GL application language (features of C, APL2, Common LISP).

- Designed/implemented automated (software) agent-based trading/broker system. System supported a variety of anonymous bid-ask paradigms and a variety of instrument types in a high-performance environment.
- Architecture, design, and implementation of new computer system for agency operations for a major New York financial/insurance company. System transitioned field workforce to use laptop computers for all agency operations.

Telephony

- Maintained/improved a critical system for network surveillance for New York Telephone. Responsibilities included adding features and troubleshooting bugs in kernel software and applications software; adding additional reporting/diagnostic software. System performed real-time troubleshooting of phone network and fed a "war room" display.
- Designed and built line management and system software for a data communications network controller for a combined voice/data communications network for New York Telephone.
- Developed interactive/response telephone applications (900 service) for mass announcements, polling, personal services (horoscope, personal ads, voice mail) using DTMF (Touch Tone) as input. System was in use by dozens of newspapers for personal ads.

Records/Privacy Management

- Chief architect and developer human information repository system for student records (PAPI Learner), and separately patient records (PAPI Patient). Developed a novel solution for managing privacy and data integrity concerns while still permitting anonymous internet access to servers. System won 2000 US Army Quality Award.
- Design and development of a hospital patient record keeping and patient severity grading system. Used by insurance companies and doctors to manage costs.

Legal

- Architecture, design, and first phase implementation of legal word processing system for a major New York law firm. The system replaces the existing ATEX systems. Automated translation of word processing formats.

Education

- Developed remote and automated software/content update using Windows-NT, Windows, and Unix systems. Client would use laptop connections and software/content would be updated automatically. Key design issues were compression, synchronization, and security.
- Distributed computer assisted instruction software for PC network. Responsible for database distribution and network support.

Defense

- Developed architecture for personalized/group training systems. Architecture (LTSA, see above) has been adopted by DoD Joint Technical Architecture (JTA).
- Developed Metadata Registry for automated command/control (C2) applications for international coalition forces. Tools support automated translation for different languages/cultures/doctrines.
- Developed Data Interoperability Framework. Worked with Defense Information Systems Agency (DISA) to develop semantic interoperability model (both technical and management approaches).

OPERATIONS:

- Lead system administrator (10+ years) for server farm that included approximately 100 web servers and network infrastructure.
- Lead system administrator (5+ years) for high-performance graphics/video development network that included approximately 50 users, a combination of Mac, MS Windows, and Linux/Unix/Solaris workstations.
- Part of operations team (15 years) for payroll, accounts payable, and student reporting.

TEACHING, PAPERS, AND DOCUMENTS:

Teaching/Training/Tutoring/Mentoring

- Taught software methodology courses, covering version control, release control, build methodology, media creation, development cycle, risk assessment, testing, management techniques, problem tracking.

Curriculum Vitae for Frank Farance

- Taught UNIX internals courses (AT&T, BSD, Sun), covering design and implementation of: system call interface, process scheduling, memory management, device drivers, file system, interprocess communication, networking.
- As Vice Chair of IEEE Learning Technology Standards Committee (LTSC), I trained over a dozen chairmen/ chairwomen in the standards development process. Taught consensus-building techniques, process, procedures. My teaching materials are the basis for officer training for INCITS standards committees ("<http://www.incits.org>").
- Tutorial/presentation to NIST Namespace Forum (2002-07) on "Background on Namespaces, XML, and Their Applicability to ISO/IEC 11179".
- Guest speaker at Chinese Distance Learning Forum in Beijing, China (2001-12) on "International Standards Strategies for Information Technology for Learning, Education, and Training".
- Tutorial/presentation at 2000 European Healthcare Summit (TEHRE) on "Using Standards to Facilitate Technical Development: Choosing The Right Tools".
- Tutorial/presentation at 2000-05 TEPR Healthcare Conference on "Public and Private Information (PAPI) Innovations for Standardizing Human Records, an Initiative by the US ARMY AMEDD/UAN/CECOM Cross-Industry Technology Integration"
- Tutorial/presentation at 1999-05 TEPR Healthcare Conference on "Privacy Issues for Healthcare"
- Tutorial/presentation at 1998-05 TEPR Healthcare Conference on "Legacy System Issues"

Papers/Documents

- "Using XML in Metadata-Enabled Infrastructure", 2009-04, ISO Focus, international magazine for standardization.
- "Standards and US Competitiveness", 1997-06, White House Technology Policy Working Group. Paper on US competitiveness and standards activity. Was selected for publication on their web site (cached at "<http://farance.com/wh-tpwg-ff.html>", also see: "<http://nii.nist.gov/cat/tp/tpff.html>").
- "Choosing an architecture for the GII", 1996-08, discusses the issues related to picking an appropriate GII architecture -- actually, the paper demonstrates why there is no single GII architecture. The paper discusses the limitations of analysis and, in particular, the limitations of applying object-oriented technology in cross-industry solutions. Additionally, the paper explores the notions of "middleware" and "bitways" and reveals flaws in these terms. See "<http://farance.com/standards/gii-arch-issues>".
- Wrote a complete operations manual for a UNIX 4.0 system. The manual was intended for the novice user who had little experience with the UNIX System.
- "EPUB White Paper", 1995-11, a white paper on electronic publications and consolidating forms and formats of multimedia.
- "Extended Identifiers", 1995-12, extending the C language to include international characters within identifiers (variables).
- "Extended String Literals", 1995-12, extending the C language, its libraries, and its environment to include a paradigm for including international characters as program and file data.
- "Extensions to <inttypes.h>", 1995-12, extending C's integral types to include, via preprocessor extension, specification by separable attributes.
- "Issues on overloading", 1995-12, general paper on design and semantics of several overloading techniques for C.
- "Issues on C Binding for LID", 1995-12, addressed problems with specifying different implementations of datatypes and the associated problems with promotion rules.
- "Issues on C Binding for LPC", 1995-12, addressed problems with the lightweight (interlanguage) and the heavyweight (remote procedure call) paradigms and recommended initial work only on the lightweight paradigm.
- "Assorted Preprocessor Extensions", 1995-12, a proposal for adding a more general macro facility to the C programming language.
- "Extended Characters Analysis", 1995-08, addressed issues concerning internationalized programming paradigms and the minimum application that could be ported across all internationalized environments.
- "Experience with JTC1 Electronic Document Format", 1995-08, an analysis of the problems associated with the proposed ISO JTC1 format along with recommendations for solutions to the document development and distribution problems.
- "Impact of adding WG11's LIA-1, LID, and LPC features", 1995-08, liaison statement of feasibility for providing a C binding of features.

Curriculum Vitae for Frank Farance

- "Ordering and Alignment Extensions (OAX)", 1995-08, a proposal for adding bit/byte ordering and alignment for interfacing to external (e.g., shared memory and network) data formats.
- "Data Representation Extensions (REP)", 1995-08, a proposal for adding support for twos complement data representation for interfacing to external (e.g., network) data formats.
- "C Binding of ISO 10967-1 (LIA-1)", 1995-08 (revision in 1995-12), the binding of the Language Independent Arithmetic 1 standard to the C programming language.
- "Extending character constants for named characters", 1994-12, investigating specifying extended characters via spelling by name or value.
- "Arrays as first class objects", 1994-12, a proposal for allowing certain arrays to be copied and passed by value.
- "Extending VLA's to include variable rank arrays", 1994-12, a proposal for allowing certain function arguments to vary in rank, as in APL.
- "Adding support for distributed objects", 1994-12, a proposal to include layout and discontinuous objects as had been implemented in several parallel programming languages.
- "Specification-Based Extended Integer Range", 1994-10 (revisions in 1995-04, 1995-08), a proposal to specify extended integers, i.e., outside the traditional C datatypes, that included parameterization of the attributes of the type.
- "DPCE Array Slicing Proposal", 1994-04, a proposal to provide a slicing feature similar to HPF and APL.
- Presented technical paper at February 1986 UniForum conference on distributed database design.

EDUCATION:

1976-09 to 1980-05: Yale University, New Haven, CT. Graduated B.S. in Computer Science.

1972-09 to 1976-06: Freeport High School, Freeport, NY. Outstanding achievements:

- National Math Exam (M.A.A.): 3rd of 400,000 in 1975. Honor Roll (top 100 of 400,000) 1971, 1972, 1973, 1974, 1975.
- U.S. Olympiad: 1971, 1972, 1973, 1974, Alternate for U.S. Math Team in 1975.

01/22/2009

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- New Published Standards
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 - RD-1 (official version - 2008.11.10)
 - RD-1 (redline version - 2008.11.10)
- RD-2, Organization and Procedures
 - RD-2 (official version)

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- RD-3, Officers' Guide
- RD-4, Secretariat Services
- RD-5, Project Proposal Guide
 - RD-5 Checklist
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