The History of Lisp Standardization during 1984 – 1990

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1. Introduction

This paper describes what the author observed from his work as a member of the X3J13 Common Lisp Standardization committee in the period between 1984 and 1990. Prior to writing this paper, the author wrote three research notes [Ida2000][Ida2001][Ida2002] in Japanese, which cover the detailed data of the standardization work and restructuring of the standardization process for the period. In these notes, he pointed out the following five characteristics of the Common Lisp standardization effort.

1) At the start, the stated goal was to "standardize the practice for the existing applications." But this principle was abandoned, especially with the introduction of CLOS object-oriented features. The introduction of CLOS was basically a technically right direction, but the members of X3J13 did not take care of the issues for deployment of the technology. They just wanted to make new things happen. Existing commercial products used very different mechanism and idea.

2) The process toward making ISO standard was introduced prematurely without adequate "diplomatic" preparation. As a result, there was some resistance from Europe and Japan.

3) Performance of the commercial implementations was not good.

4) In the boom for AI, academia in the US did not participate in the standardization process.
   So there was no academic or vendor-neutral view from them. It was difficult for company people to discuss technical issues from an objective and disinterested point of view.

5) There were big national projects in several countries. Then mass media thought the AI/Lisp trend was a fad and did not think the standardization movement would have long-term consequences.

After publishing the three research notes, the author wanted to find the fundamental reasons behind the above five. This is the reason why the author wrote this paper. The author is responsible for the entire contents, but he got lots of inputs from other people who shared the work to make this paper. The author greatly thanks them.

2. The History centering around X3J13 activity

The author could find no published reports of X3J13 activity except [Ida2001] and [Ida2002], while the works in Japan [Ida90] and in Europe [Roth91] were reported. There has been no attempt at academic analysis of the period yet. The author thinks the 1980s are important to analyze. The year after 1994 is the official step to publish the ANSI standard [ANSI-CL], and the year after 1990 when CLtL2 was published were mostly spent for internal works to fix the error or clarifying the meaning for X3J13.

ISO Lisp group worked to make a draft for ISLisp for this period, but the author has less knowledge for it, so there is few contents on ISLisp. There was a "pre-history" era for Common Lisp (1981-1984), which is not covered well in this paper. And the whole story was benefited by the emerging availability of the Internet. Common Lisp was one of the first programming languages whose design process was conducted primarily by Internet.

2.1 Year 1984

(i) The Fact
In 1984, Common Lisp: the Language (CLtL1) was published [CLtL1], as a result of the efforts of the Common Lisp Group. The author got the right to translate into Japanese, and started the work for making a committee for Common Lisp standardization in Japan [Ida84].
Available Common Lisp implementations were Symbolics Common Lisp, Kyoto Common Lisp, Golden Common Lisp and others. (Later there were the implementations for workstations such as those from Lucid Inc and Franz Inc.)

   In summer, there was a Lisp Conference in Austin. This event was the first time for the author to meet most of the people. The author gave Guy Steele an errata list for CLtL1 containing almost 100 items. This is the beginning of the story.

(ii) Interpretations
CLtL1 was the output of a hastily united group of MacLisp successors, who felt InterLisp group was stronger than they were. They did not dream of international matters or even of commercial interests. Most of them thought it is just a US academic research matter: most of them did not know how to make international standards, or even American national standards.

In Japan, the 5th generation computer project was hot, featuring Prolog. The author had been seeking a chance to unite the industrial Lisp implementers (not just academic ones). Moreover, the Japanese government was urging positive participation in international standard making. For these two reasons, the author got relatively big numbers of members on his committee [Ida90]. Since the work did not address making a national official body for the standard of "Programming Language Lisp" initially, the committee started inside JEIDA (Japan Electronics Industries Development Association).

In Europe, the LeLisp group in France started aiming for the wide use of the language as a tool to make European AI software. Some of them tried to have non-US software entirely. And some of them seemed

to have the contacts with the business of official standard making. In other words, they knew how to make a language standard (while the Japanese in this context tried to have industrial strength, and the US tried to be successful with MacLisp successors.)

2.2 Year 1985 and 1986

(i) The Fact
The Jeida Committee started in Japan in April 1985 and had monthly meetings after that until 1992. The EuLisp Committee started in Europe in summer 1985. Jeida activity was not a part of governmental standardization work, but the EuLisp Committee got CEC authorization at some point. There was a workshop on object-oriented extension of Common Lisp in summer. The author started his research on object-oriented facilities in 1985. There were three candidates; CommonLoops, NewFlavors, and the HP proposal, he visited Xerox PARC twice to discuss CommonLoops.

The Jeida Committee produced the Common Lisp/Core specification in June 1986 [JEIDA86] which was quoted in the New Work Item [ISO86].

The US started the X3J13 committee to make Common Lisp a national standard in 1986. The first X3J13 meeting was held in Washington D.C. on September 23 and 24 in 1986, where the target date for the standard was set as "Fall 1988." The second meeting was in Dallas in December 86. Jerome Chailloux from France was present at this meeting. Bob Mathis was chosen as chair of X3J13; he also gave a short report on Japanese Lisp activities. (The author first attended X3J13 meeting in March 1987, after a year of participation by e-mail.) Richard Gabriel gave a report on EuLisp meeting, which raised the Lisp1/Lisp2 issue within X3J13 [RPGKMP86].

 In October 1986, at the governmental roundtable, the Japanese government received an official request from the French government to participate the EuLisp development activity [MITI86], and replied with a letter taking more neutral position between the US and France[JEIDA86]. (In the slides of French delegation prepared by Jerome Chailloux, they referred to their Lisp a "European Common Lisp.") In response to this decision, the author gave the chairmanship of JISLispWG to Professor Itoh, and concentrated on the work with Common Lisp at Jeida.

X3J13 then decided to set the making of an international standard as a part of its goal, and invited several persons from Europe and Japan as members. The InterLisp group and other Lisp dialects joined the X3J13 activities, but there were still internal struggles.

In summer 1986, there was a workshop on object-oriented facilities for Common Lisp.

From Nov.11 to 13 1986, ISO/TC97/SC22 Advisory Meeting was held in Vienna. Bob Mathis wrote the draft New Work Item for ISO [ISO86], stating his idea clearly toward the ISO standard. This NWI was registered as N279, which was approved as is with the following addition; the convener was to be from France and the project editor from the USA. The minutes were brought back to each nation. The

meeting report to Japan by the Japanese delegation was 1987-07-22JISLispWG, contains this one addition; "Secretariat is from France." The author could not find any specific report from the US delegation in the X3J13 documents. The European report to the EuLisp group can be found in the 13th EuLisp meeting record which was included in the JISLispWG minutes as the 61-6-5. The european delegation wrote a more detailed explanation of the process. Here is their summary. "AFNOR proposed EuLisp based plan. ANSI proposed a different one[ISO86]. SC22 advisory committee asked both to write new draft New Work Item jointly. The time limit is January 1989. Then vote again. Richard Gabriel distributed a document on Lisp1/Lisp2[RPGKMP86] and told that 1)by eliminating function cell, Common Lisp and Scheme can co-exist, 2)Lisp2 is more efficient than Lisp1, 3)the necessary time period to make Common Lisp may be 5 years and during which vendors and users can migrate to a new standard, 4)mixing the ISO work and the ANSI work enables to get DOD support, 5)CommonLoops based object orient standard will be ready in January 1987." [citations and item numbers added by this author]

(ii) Interpretations
The year 1985 was a quiet year in the USA in the context of standardization. When the US attempted to make official Common Lisp standard, there were already international structures in place for Lisp standardization. There was huge enthusiasm around Common Lisp and Lisp in general as a tool for AI.

Once X3J13 started, there was no way to escape from the ISO matter, while most of X3J13 members had no concrete and detailed knowledge about it.

December 1986 onward, the X3J13 efforts was totally an international activity, not an effort of the US alone; France and Japan were involved early on, and the UK and Germany joined as well. (The comment "*they didn't make any effort to include representatives from other countries. They didn't think anyone else would be interested. They were wrong*" (as of September 30, 2002) in http://www.lisp.org/table/related-languages.htm#islisp, is itself entirely wrong.)

There were reports on the French attitude against the USA and how they used their wisdom to make their goal happen [Roth91][MITI86]. The X3J13 members were good technology experts, but they were not expert in diplomatic tactics. France had a more systematic approach to achieve its goal than the US or Japan.

The road map toward ISO written by Bob Mathis reflects the committee's judgment of the moment as a matter of fact; The technical discussion seemed to be over and the rest was the steps toward internationalization. It was misunderstanding or wrong evaluation. (Later Bob Mathis resigned from chairmanship and the X3J13 became a meeting place for technical innovation, not just standardization of existing practice.)

The introduction of CLOS in the middle of the standardization process was the source of failure and success both. We did not realize what big effects the introduction of an object-oriented facility would have on the underlying language. The inclusion of CLOS was done without any consideration for

international politics, while technically it was welcomed. It came on stage without existing commercial implementations and predefined tactics.

2.3 1987 - 1990

(i) The Fact
In 1988, the first draft X3J13 Common Lisp was formed, but at the same time, the CLOS specification was finalized [CLOS]. CLtL2 was published in 1990, mainly purposed with the inclusion of CLOS and updates in the details of the language [CLtL2]. ISO started a Committee for Lisp standardization. Corrections and clarifications of huge numbers of items were processed by X3J13, including a series of papers on multinational character handling extension, starting from the paper by Thom Linden [Linden87].   The Jeida Committee produced Nihongo Common Lisp Guideline [Jeida92].

The X3J13 committee got a huge amount of 'improvements' so that the committee inside was governed by an atmosphere of internal work. The cleanup issues document printed and circulated at the meeting in summer 1987 was 1 inch thick (and more and more items came later).

Symbolics went chapter 11 after 1990. Lucid Inc. went bankrupt later in 1994.

(ii) Interpretations
The AI boom ended in this period, while the international standardization activity itself became hot. The ISO committee for Lisp standardization was governed by French, and the US tried to delay the establishment using small tactics.

3. Lisp1 and/or Lisp2
[This chapter is a translation of the corresponding section in [Ida2001] into English.]

3.1 Lisp1/Lisp2 issue as a political issue disguised as a technical issue
The Lisp1/Lisp2 was characterized in the paper, "Issues of Separation in Function Cells and Value Cells" by Dick Gabriel and Kent Pitman [RPGKMP86]. The symbolic problem is the next, which is described in the paper, though this problem is not all the technical contents for the issue.
Problem: Having the following two procedures, *f* and *g*, which *f* is used during the execution of the procedure g? The passed procedure or the globally defined one?

$$f(x) = x + 1, \quad g(f) = f(3);$$

For the system which has function cells and variable cells separately, *f(3)* always try to use the function cell contents first. For the system which has one cell for value of each name, *f(3)* try to use the contents of the current cell, which was just passed to the procedure *g* at the entry.
The former system is called Lisp2, and the latter is Lisp1. Common Lisp, its predecessors and successors are Lisp2, and EuLisp, Scheme are Lisp1. This paper concludes Lisp2 is legitimate and in most of the technical sense, Lisp2 is superior than Lisp1.
The paper [RPGKMP86] describes in details for the comparison between Lisp1 and Lisp2 in a very

academic manner. It discussed which has better performance in nature and so on, even the procedure and cost to convert Lisp2 software to Lisp1 conformed one were discussed. Furthermore, CommonSCHEME which would be a bridge between Common Lisp and Scheme is proposed for the case Lisp1 and Lisp2 would be integrated. Technically this paper had a reasonable contents, but as a document registered in a standardization work, it had critical weakness. That is, it assumed the existence of Lisp1 in the framework of the discussion, treated it as a comparable alternative for Lisp2. It gave the feeling for other groups that X3J13 did not always push Common Lisp. The members of X3J13 tried to be technically neutral and tried to obtain the result for Lisp2, as a very objective result. It gave a chance for Lisp1 to be considered as an alternative candidate for international standardization. At least in Japan, as a result, discussing Lisp1 as an alternative became to be NON-taboo, because the USA is talking about it. Then it gave a chance for France and other Europe nations to approach Japan to shake hand having Lisp1.

This Lisp1/Lisp2 paper, written by the X3J13's project editor and the representative for international matter, even contains a paragraph for the following.

> EuLisp did have been going to have 3 level layerd approach. Level 0 is called minimal Lisp, level 1 is mostly what EuLisp is thinking, level 2 is equivalent level of Common Lisp. And Chailloux and Padget commented that Common Lisp would be in trouble because it is Lisp2 during the meeting, and there would arise messy political controversy if the US cannot make the integration, where EuLisp is announced as Lisp1. [quoted from RPGKMP86]

The author judge the above process itself was in the pace for Europe. It was in 1986, which is just the year X3J13 started. But, the members of the X3J13 still kept the touch for technically good.

3.2 Layered Approach for ISO standard was really possible?

There were two issues related to this topic. One is Lisp1/Lisp2 issue, which was thought as a pure technical discussion. The other is whether possible ISO Lisp can have integration of the opinions with the introduction of layered approach. The former issue was discussed in [Ida2001]. This section is going to focus on the latter issue. Namely the possibility for layered approach.

Layered approach is in general, to cover the difference of platforms in a single standard, or to cope with the difference in the complexity of applications. Sometimes designer may judge implementations used for very simple applications requires only basic level., so that the performance in the sense of memory usage or the one obtained from its compactness may be effective. And, for smaller machines, implementations with full specification sometimes cannot fit.

Sometimes we argue about the subsetting for pedagogical reasons. Teachers say "for my class only subset is needed." Is it a base for subset for ISO?   We can clearly judge that there is no standard set for subset in class room environment, unless the contents to teach is unified into the one the world follows. But in the discussion for X3J13, the above three matters are interchangeably discussed.

Furthermore, Layered approach seemed to be considered as a point of compromise in early stage of X3J13, to get an integrated specification satisfying European and Japanese activities. This issue had a clear and concrete figure for X3J13 discussion. The Lisp1/Lisp2 issue is it. With the introduction of this issue on the X3J13 table, the charter and the purpose of X3J13 got a weak point where EuLisp activity can later catch and eat.

4. On the differences of the standardization policies among three nations

The US governmental guideline for industry seemed to make one unique solution or there is no guideline. Both scenario may be applicable for the Common Lisp case. For the former scenario, MacLisp successors feared to lose their position against InterLisp community. The standardization process was under the restructuring in the period [Ida2000]. (Meanwhile the Japanese one is always trying to preserve the structure for competition and to keep the harmony, and France for the case was very experienced with the struggle among nations based on their history.)

In Japan, there was divergence of a national standard making and a technical activity for Common Lisp. The symbolic event was the process to reply the French proposal. Some of them tried to be independent (not following the US line), some are in favor of European, and some are not. This divergence itself is one of the sources of diminishing the energy, though the release of Kyoto Common Lisp in 1984 and the start of Jeida Common Lisp Committee in 1985 were ahead of the similar works in Europe and in the US.

ISO is numbers. Europe has it and knew how to use it. The industries in Europe still want Common Lisp for many applications but the voices for EuLisp were stronger [Roth91]. And ISLisp was born. For governmental level, French was very clear on what to do. French asked Japan to join them. Japan was passive in the government level, and have consistent attitude for admitting any ISO standards. The USA seemed to have no governmental efforts for other nations. French was very clear on what to do too. Namely they took the position for "join us and abandon USA." Japan had two way systems; one is formal way to make national-then-international standard, the other is civil way to participate the Common Lisp standardization. The USA attitude was simply "you may join us."

5. Conclusions

In 1985, when the Common Lisp Group began its convert itself into an official standards process in the USA, there were already structures and processes in place for Lisp standardization within ISO. In other words, by the time X3J13 was formally created in 1986, the destiny of Common Lisp at the international level was already fixed as a matter of fact.

There is a perception that the Common Lisp Group, and later X3J13, excluded international participation in the development of Common Lisp. We believe this is not true, but a confusion arose because of the changing goals of the group. In 1981, when the Common Lisp effort began, it was considered merely a cooperation among various research groups funded by DARPA, and therefore naturally a US-only effort. When X3J13 was formed five years later, CLtL had already been published, so it seemed that the design was complete and there was no further opportunity for international influence. But in fact X3J13 made many changes and extensions (notably CLOS) to Common Lisp beyond CLtL, and X3J13 during this time had technical voting members from France, Japan, Germany and the UK.

X3J13, under the guidance of Bob Mathis, who was familiar with ISO procedures, established a road

map in 1986 that, if followed, would have led to a timely submission of a proposed standard for Common Lisp to ISO in 1988. But X3J13 then chose to pursue the design of major extensions to the language, especially CLOS. This led to both success and failure. The success was the adoption of a useful object-oriented facility into Common Lisp as a de facto standard. The failure was that this delayed the plan for submission to ISO by several years. As a result, Common Lisp never became an official international standard.

A commonly observed organization for standards bodies is that by a "technical group" but under the direction of a "political group" whose job is to ensure that the actions of the technical group support the goals of national policy. But in the US, in the 1980s, a single X3 group, such as X3J13, could in effect make decisions about both technical and policy issues and could supply international representatives directly to ISO. The decision to add CLOS to Common Lisp on the surface appeared to be a technical issue, but it also turned out to be an important policy decision because it changed the schedule for interaction with ISO. While there was a supervising X3 committee whose job was to make sure that X3J13 followed X3 rules, there was no separate committee whose job was to ensure that X3J13 followed the established schedule. This is both a strength and a weakness. It is natural for a technical group to want to continue to make technical advances. This is exactly what X3J13 did. But it failed in its political goal because it did not have the self-discipline to stick to its own stated national policy. The Lisp/1/Lisp2 issue was one example of the lack of policy in the USA.

The French government approached Japan in 1986 and asked them to join the French efforts. France had had a clear national goal and a more systematic approach to achieve its goal than the US or Japan. ISO is numbers. Europe has more. And no national standardization organization can escape form the ISO issue.

Two independent activities in Japan affected the starting up of the standardization process. One was the release of Kyoto Common Lisp in 1984, and the other was the start of Jeida Common Lisp Committee in Spring in 1985. They were ahead of the similar organizational works in Europe and in the USA. But the divergence of the JIS working group and the JEIDA group diminished their energy.

The author titled this paper "What happened to Common Lisp: Programming Language Inventors must know" in the first draft. Common Lisp got a huge extraordinary success for the initial step. It is remarkable that it was done in the USA, the birthplace of Lisp, for such a collaborative work. Similar story might happen to others who have success in technological innovation and then try to make it a widely used one on this globe, after they get over the entrepreneurship bar. Standards are important, but we need to think about the roadmap before its start, and the timing to start.

Acknowledgments

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