

**ECIX**  
**Quick Reference Data for Compliance Level 1**  
**QRD CL1**

Version 3.0-021599

By

Contributing Customer Advisory Board (CAB) Members:

Hewlett-Packard

Lucent Technologies

NIST

Seagate

Tektronix

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## **1.0 Introduction and Overview**

### **1.1 Background**

The ECIX Customer Advisory Board (CAB) was originally conceived by Si2 in the first half of 1998 and was formed in September 1998. The CAB has had active representation from Hewlett-Packard, Lucent Technologies, the National Institute of Standards and Technology (NIST), Seagate, Tektronix, and Xerox.

The ECIX CAB was formed to pursue the following objectives:

- Identify opportunities for data supply improvement
- Identify requirements for component and IP information
- Map those requirements to ECIX
- Identify special data needs from technology suppliers
- Communicate results to industry (via ECIX PTAB)

This requirements document represents the CAB's results from working on the above objectives.

### **1.2 Initial CAB Meeting Results and Observations**

During initial telephone conferences and meetings it became very obvious that all of the companies had similar yet different processes used to secure, store and retrieve supplier product design information. As these processes were discussed, some observations were made:

- All the companies could benefit from a standard interchange process
- All but one of the companies wanted or required an incremental information exchange capability
- All of the companies have mature local systems that interact with supplier product information and furthermore any new standard must co-exist with these legacy systems.

Another significant observation that these CAB companies made was that the PTAB supplier companies alone do not represent enough suppliers to achieve real industry adoption of ECIX at the level desired by the CAB, who have tens or hundreds of suppliers. It was also understood that suppliers also have very complex information authoring, and data information systems. Any standard enhancements must preserve these legacy processes and data for as long as it is useful to those companies.

### **1.3 Initial Views of Potential Solutions**

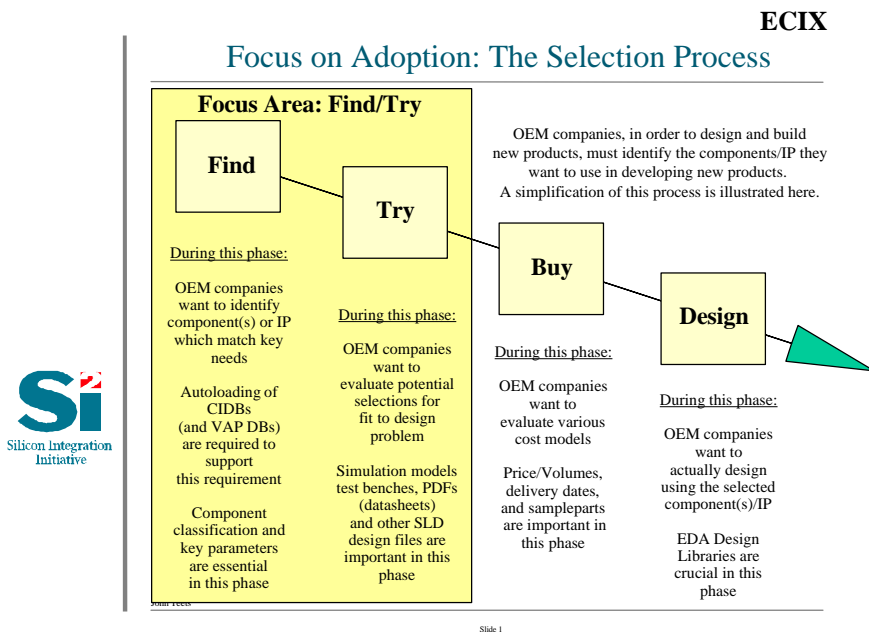
The CAB quickly recognized that categorization of supplier products (commodities) represented a significant technical and emotional hurdle to overcome. Each supplier company and CAB company has a unique and different scheme for categorizing its products. When scrutinized closely, one can find multiple products from the same company with electrical characteristics that vary less than 2%, and that perform the exact same function, but the products are named differently.

The CAB worked to define a flat schema to represent commodities. In theory, this schema would be used to define the information desired for each commodity type so that a standard interchange could be implemented in ECIX. When presented to the other ECIX member companies, several company representatives pointed out that the maintenance of a schema could prove to be quite costly and an acceptable quick update process would be difficult to define and implement. A compromise was reached that supports the primary goals defined by ECIX suppliers and customers without the use of *any* explicit product schema. This compromise led to a definition of "Quick Reference Data for Compliance Level 1 (QRD CL1)". QRD CL1 will provide the ability for suppliers to provide usable and useful product information that facilitates electronic search and retrieval by customers.

**1.4 Solution Efforts**

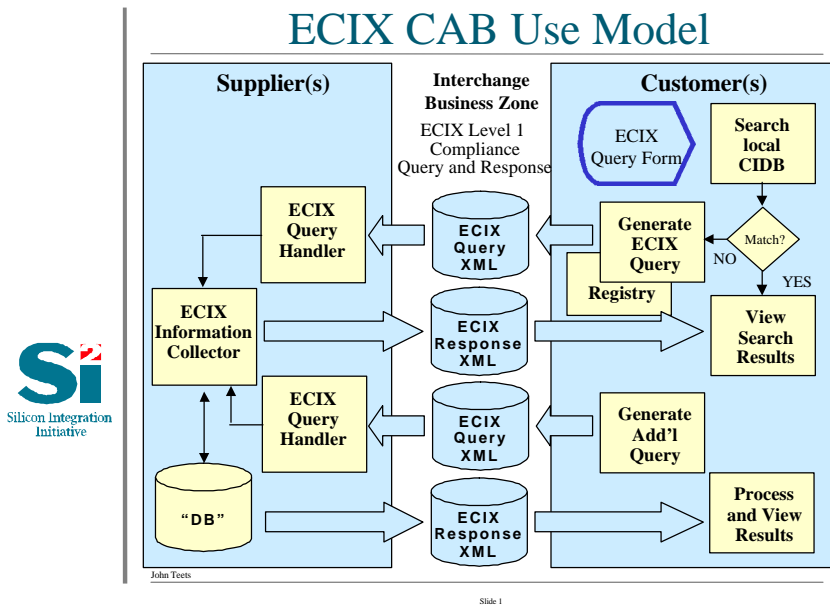
A cornerstone challenge was the identification of an acceptable set of component information parameters to support electronic search and retrieval. This effort has been the major focus item of the CAB group since September of 1998. All the active CAB members have contributed to the definition of this parameter information. The CAB believes that this document describes a very strong base for ECIX development, and is based on the FIND & TRY paradigms that have been discussed between the CAB and the PTAB. Refer to the diagram below for a view of the FIND, TRY, BUY, and DESIGN paradigm.

In the previous paragraph we stated that the QRD CL1 parameters supported the FIND & TRY portions of the design process. The total design process has been defined by the terms: FIND, TRY, BUY, & DESIGN. A decision was made to focus our scope initially to the FIND & TRY paradigms. This limitation on scope formed the basis for a minimum compliance level that was truly useful, and could be easily adopted by all suppliers and customers. It is anticipated that after some experience with FIND & TRY, the concept will be broadened to include further specific requirements models for BUY & DESIGN.



### 1.5 Use Models

The CAB defined, refined, and has a comprehensive use model for ECIX QRD CL1, as shown below in "ECIX CAB Use Model". This use model articulates how customers at CAB facilities will ask for information using a query/response process model over the Internet.



The CAB studied information content required to replace their current information processes. Currently customers employ several methods to obtain electronic product information. Development and support engineers have developed these legacy information collection methods in an ad hoc fashion. A common element of all the product information processes at the CAB companies is that the designer must accept all the information provided at one time. This "all or nothing" process places pressure on the information systems processes. Additionally, the amount of information is not conducive to competitive comparisons between supplier offerings. The use model (FIND, TRY, BUY, & DESIGN) defined by the CAB will provide a level of efficiency not possible with the current processes.

The recommended query/response philosophy supports a granular information transfer concept and efficient and timely data information transfers for the designer. The designer can accept QRD CL1 information without the requirement to process information that may not be required. Further, as the designer refines the possible candidate parts that fit a design problem, a request may be submitted for the additional information required. The CAB has identified the specific ECIX information required to support the customer FIND & TRY process.

The ECIX architecture supports the inclusion of additional component information as the QRD CL1 concept is expanded and matures. The CAB also recognizes the need to support the BUY & DESIGN portions of the information access paradigm. It is believed that the proposed development activities can be supported with available technology. Effort focused on defining and modeling per the CAB use model is important and necessary. The CAB, working under project time constraints and wishing to provide new suppliers with an achievable target, determined and agreed that the FIND & TRY paradigm should be supported. By supporting the FIND and TRY paradigm, an effective and affordable target for both suppliers and customers can be achieved in a timely manner, leading to much broader industry adoption of ECIX.

## 1.6 ECIX Quick Reference Data Compliance Level 1 (QRD CL1)

Current ECIX specifications are based on the Standard Generalized Markup Language (SGML). The PTAB companies have been working on the ECIX project in one form or another for several years, and SGML was adopted by the PTAB long ago as the initial interchange language for ECIX standards. The ECIX PTAB in 1998 made a decision to migrate all ECIX standards to the eXtensible Markup Language (XML), with a target of mid-1999 for availability. The CAB team has an objective to recruit their major suppliers as ECIX QRD CL1 Compliant suppliers. Therefore, ECIX QRD CL1 has an additional requirement of XML compliance.

The granular segmentation and delivery of information that customers require, and the ECIX architecture capability that provides granular information delivery, work together to support the QRD CL1 concept. The CAB feels that as more use models are defined and implemented, "Compliance Level" will be a significant decision point affecting product selection. The CAB feels that a process for identification of design information elements and associated compliance level certification will serve to keep the standard viable as information and design needs change.

After discussion the CAB feels that a supplier will be certified as compliant to QRD CL1 supplier when:

1. The supplier supports a compliant "QRD CL1 Query Handler" on an Internet site that will accept standard QRD CL1 queries from compliant "QRD CL1 Query Generators" at customer companies (See ECIX Use Model Diagram).
2. The customers will issue standard QRD CL1 queries, which will be based on the FIND & TRY information required to support "component information search and retrieval".
3. The supplier determines products that match the query, and returns a standard QRD CL1 response (See ECIX Use Model Diagram). The standard response always includes a pointer to the datasheet in PDF format.
4. The supplier can optionally include in responses pointers to additional information (e.g., simulation model, full PCIS instance, etc.).

Note that QRD CL1 response information includes a pointer to a PDF. The PDF represents the traditional datasheet. The supplier is also encouraged (see item 4) to supply additional pointers to information if available and deemed useful by the supplier, such as pointers to other PCIS or SGML files that may be useful to customers. Additional pointers to any other supplier information such as simulation models could be accessed in this fashion. It is anticipated that common practices for including additional information pointers will be included in QRD CL1 by June of 1999. This compliance level will provide an easy and cost-effective migration for ECIX suppliers, new and old. An additional support factor discussed in detail with both suppliers and CAB participants is the ECIX QuickStart program, described in section 4 of this document. The CAB fully endorses this concept.

The CAB is interested in moving ahead with the definition of additional levels of compliance. This effort may be addressed later in 1999.

## 2.0 QRD CL1 Search and Response Examples

QRD CL1 is intended to support a set of search response scenarios. The query/response process is based on the common Quick Reference Data Element (QRDE) definitions found in section 3 and the extended QRDE parameter definitions found in the appendix of this document. A comprehensive definition of the terms used in this section can be found in Section 6. The query/response examples that follow are intended to define the information that the customer will supply using the QRD CL1 query and the specific responses the supplier will provide. Each example has been named to facilitate discussion.

*All standard queries will contain the Customer DUNs Number, and at least one of the other common QRDEs.*

*All standard supplier responses will include:*

1. ALL common QRDEs (see section 3) for components which match the query
2. A direct pointer to the datasheet PDF, and
3. Optionally, any extended QRDEs (see appendix) that the supplier wishes to provide, and
4. Optionally, any pointers to additional information that the supplier wishes to provide (not yet specified in detail).

### 2.1 Part Number Search

In this first example, a customer is doing a search for component information based on part number information.

A part number search begins with the customer filling out a QRD CL1 query form. A part number query *must* contain a valid part number identification. Many suppliers use a hierarchical part number identification scheme. Therefore, a customer may use a hierarchical part number identification element in conjunction with a wild card search, such as is done for common web search engines (e.g., Alta Vista, Excite, etc.). A fully qualified specific part number entry is also valid. The *only* other required information in a part number query is the *customer DUNS number* (See Section 3.0). An interactive query generator could fill in the customer DUNS information automatically, without user interaction. The supplier will use this information to identify the customer making the query. Optionally the query may contain any or all of the common QRDE parameters. The use of common QRDE parameters is intended to limit or refine customer queries.

When searching for components from a specific supplier, using part numbers, the information the customer must supply is:

- Part number (part number may imply a wild card search or specify a particular part number). For example, Phillips has a family of parts identified as the TEA family. If the customer query contains TEA as the value in the Part Number QRDE, indicating part numbers which contain the character string TEA, there will be three complete responses, including one each for TEA1102970, TEA11029843, and TEA110276431.
  - A wild card Example is: TEA
  - A Specific part number Example is: TEA1102970
- The supplier DUNS number (e.g., 23-1046-234)
- The required customer DUNs number
- Optionally, the customer can add to the query valid values for any or all of the remaining common QRDEs

- e.g., Operating Temperature = “30<sup>0</sup>C”

The completed query can then be electronically sent to the supplier that produces the part.

The supplier(s) will respond to the query with the following:

A response that contains:

- *ALL* common QRDE information
- A pointer to the PDF (for each matching part number response)
- Any extended QRDE information the supplier wishes to provide
- Any pointers to additional information that the supplier wishes to provide

## 2.2 Key Text Parameter Search

In this example, customers will search *multiple* supplier sites simultaneously using the key text and other QRDE fields as search arguments. The intent of this search process is to find components that match the parameter information supplied in the QRD CL1 query. This usage example now follows.

The customer fills out a QRD CL1 query with "key text" entries that broadly define the type of products that the customer wants to investigate. Key Text is a common QRDE and can be used to control searches of supplier's databases. Additionally, the customer must supply his DUNS number in the query. As stated earlier, an automated query generator could fill in the DUNS identifier without manual intervention.

Key Text is free form text information. To effectively search key text operators are needed. Some operators are depicted in the examples. Therefore a key text based search must contain:

- A key text statement (a key text statement can contain complex operators)
- The customer DUNS number (e.g., 23-1046-234)

An example of a key text statement is:

Key Text = “Op Amp” *logical or* “Operational Amplifier” *logical and* Supply Voltage = 5V *logical and* (*equal to or greater than* 100MHz)

Optionally a Key Text based query may also contain any of the remaining common QRDE's. An example is:

Operating Temperature = “30<sup>0</sup>C”

A key text search can be broadcast to multiple suppliers simultaneously. To achieve this, it is envisioned that the customer will use the QRD CL1 Registry (see section 4) to identify compliant suppliers who can receive QRD CL1 queries. From this list of compliant suppliers, the customer can direct the query to the specific Internet site that can handle the customer's query.

The supplier will respond to the query with the following:

A response that contains:

- *ALL* common QRDE information (*for example, including key text information with matching information highlighted*)
- A pointer to the PDF for each matching response
- Any extended QRDE information the supplier wishes to provide
- Any pointers to additional information that the supplier wishes to provide

The supplier then sends the response form back to the customer making the query. Using the information included in the response, the customer can then use the “link to the PDF” to access a data sheet for any of the matching part numbers.

### 3.0 QRD CL1 QRDE Parameters

At a review and planning meeting held at Hewlett-Packard in late January 1999, a group of suppliers and customers reviewed and agreed on a set of common Quick Reference Data Elements (QRDE) search parameters (QRDE01 through QRDE10). A set of extended QRDEs has also been defined. The extended QRDEs include many electronic operating characteristics normally found in datasheets. The definitions for the common QRDE's follow. The definitions for extended QRDE's can be found in the appendix.

#### 3.1 Common QRDEs

The currently defined common QRDEs are:

1. Customer DUNS Number (QRDE04)
2. Key Text (QRDE09)
3. Mounting (QRDE06)
4. Operating Temperature (QRDE08)
5. Part Number (QRDE01)
6. Part Number Revision Level (*Optional*) (QRDE02)
7. Package (QRDE010)
8. Pin Count (QRDE07)
9. Supplier DUNS Number (QRDE03)
10. Technology (QRDE05)

#### 3.2 Common QRDE Definitions

While every effort was made to precisely define all QRDE's, additional work will be required to complete this effort. The common QRDE's have been reviewed by the entire ECIX project team and have been accepted as part of the ECIX QRD CL1 specification which will now be developed. The extended QRDE's are being reviewed. A change process is being developed to support on-going "requests for changes" to this document and the defined QRDE's, and review and approval of any new QRDE definitions in the QRD CL1 specification being developed.

ECIX intends to use definitions of terms from international standards where appropriate and applicable, such as IEC61360 or JEDEC standards, when those standard dictionaries meet needs. New terms may well be defined to meet new (and ECIX general) requirements. More work needs to be done in this area.

The CAB is also interested in developing the concept of the PCIS-CIDS link, which implements the dictionary reference mechanism as well, but the CAB does not feel that this is a QRD CL1 issue. The CAB wants the focus on the query/response use model, and is willing to wait for more elegant solutions to the dictionary issue. Where possible, we should focus on *using* standard definitions of terms where possible (say from IEC61360 or JEDEC), and implement the actual links later.

The CAB also recognizes that datasheet parameters from different suppliers may be measured under different conditions, and the CAB does not view this to be an issue for QRD CL1. Essentially, to meet the needs of search and

retrieval, it is sufficient to have responses returned which match the search parameters. Subsequent evaluations by customers will determine if "conditions of measurement" is a real issue that effects the selection of the commodity.

**3.2.1 Customer DUNS Number**

<b>Name</b>	<b>Customer DUNS Number</b>
<b>Identifier</b>	QRDE-04
<b>Definition</b>	The Dun & Bradstreet identifier for the customer
<b>Use</b>	To be used to identify the customer making the query
<b>Formatting Information</b>	Character Field
<b>Example</b>	04-5789-243
<b>Query/Response</b>	Query

**3.2.2 Key Text**

<b>Name</b>	<b>KeyText</b>
<b>Identifier</b>	QRDE-09
<b>Definition</b>	KeyText are words, phrases, or sentences that contain key descriptors that identify applications, operational characteristics, or other words and phrases that customers would normally use in searching for a component
<b>Use</b>	<ul style="list-style-type: none"> <li>• To provide the ability to perform a search similar to a WWW search (i.e. a string of words with Boolean operators)</li> <li>• Provide Suppliers a place to provide differentiating information (e.g. Green Power Products)</li> <li>• Provide Suppliers a place to provide narrative information describing the component. Suppliers could include the abstract information from traditional data sheets here</li> <li>• If Suppliers have components that do not fit normal electrical parameter definitions the supplier could include text germane to that product. Suppliers could then search on these new characterizations</li> </ul>
<b>Formatting Information</b>	Character
<b>Example</b>	<ul style="list-style-type: none"> <li>• The CLC949 is an excellent low power operational amplifier</li> <li>• The Pentium II microprocessor family is available in multiple clock speeds (200MHz, 300MHz)</li> </ul>
<b>Query/Response</b>	Both

**3.2.3 Mounting**

<b>Name</b>	<b>Mounting</b>
<b>Identifier</b>	QRDE-06
<b>Definition</b>	Identifies the technology required to affix the product during mfg.
<b>Use</b>	To determine the products appropriateness for a given customers Manufacturing process
<b>Formatting Information</b>	Character Field
<b>Example</b>	Thru Hole, Surface Mount
<b>Query/Response</b>	Both

**3.2.4 Operating Temperature**

<b>Name</b>	<b>Operating Temperature</b>
<b>Identifier</b>	QRDE-08
<b>Definition</b>	Nominal temperature at which the product is designed to operate.
<b>Use</b>	Define the product operating environment
<b>Formatting Information</b>	Real Number (temperature defined in Celcius
<b>Example</b>	30°C
<b>Query/Response</b>	Both

**3.2.5 Package**

<b>Name</b>	<b>Package</b>
<b>Identifier</b>	QRDE-10
<b>Definition</b>	Identifies the encapsulation type in which the component is used
<b>Use</b>	Determine if the product is useful in the customers manufacturing process. Used to determine size. Answers the question, is manufacturing capable of handling the part? May map the part to the actual drawing or industry specification
<b>Formatting Information</b>	Character
<b>Example</b>	<ul style="list-style-type: none"><li>• Dip</li><li>• SOT 23</li><li>• XY 11</li><li>• Bare Die</li></ul>
<b>Query/Response</b>	Both

**3.2.6 Part Number**

<b>Name</b>	<b>Part Number</b>
<b>Identifier</b>	QRDE-01
<b>Definition</b>	A string of alphanumeric characters that identify the suppliers product with no implied specificity of the identification or semantics.
<b>Use</b>	<p>Query Use:</p> <p>A wild card family search to retrieve parts in a specific family (e.g. TEAXX family)</p> <p>Customer may further restrict the query by entering values and associated QRDE's (e.g. could enter 100 nanoseconds for access time)</p> <p><b>Response Use:</b></p> <p>If a supplier can supply a specific part number (pid.specific) that would be great, but a generic part number (pid.generic) would be ok. The response must be clearly identified as a specific or generic id.</p>
<b>Formatting Information</b>	Character Field
<b>Example</b>	<p>CLC949, NAT001, or</p> <p>Examples of varying levels of specificity, A supplier may respond with based on a generic part number query of</p> <p>TEA11</p> <p>TEA11XX</p> <p>TEA1102</p>
<b>Query/Response</b>	Both

**3.2.7 Part Number Revision Level**

<b>Name</b>	<b>Part Number Revision Level (Optional)</b>
<b>Identifier</b>	QRDE-02
<b>Definition</b>	An indicator of the release level of this specific component
<b>Use</b>	To identify the revision level of the part so that when the customer reorders the part or re-evaluates the design they can be aware of changes or potential problem
<b>Formatting Information</b>	Character Field
<b>Example</b>	AE01
<b>Query/Response</b>	Both

**3.2.8 Pin Count**

<b>Name</b>	<b>Pin Count</b>
<b>Identifier</b>	QRDE-07
<b>Definition</b>	Identifies the number of physical connection points (e.g. pins, pads, balls) on the package
<b>Use</b>	A rough indicator of the size and complexity of the product
<b>Formatting Information</b>	Integer, value can be 0 or greater (0=ferrite core)
<b>Example</b>	8 or 32 or 122
<b>Query/Response</b>	Both

**3.2.9 Supplier Duns Number**

<b>Name</b>	<b>Supplier DUNS Number</b>
<b>Identifier</b>	QRDE-03
<b>Definition</b>	The Dun & Bradstreet identifier that is appropriate to the commodity
<b>Use</b>	To be used to identify the Supplier responding to the query. It is assumed that the supplier Duns and Part Number are needed to uniquely identify the supplier that is responding
<b>Formatting Information</b>	Character Field
<b>Example</b>	04-5789-243
<b>Query/Response</b>	Response

**3.2.10 Technology**

<b>Name</b>	<b>Technology</b>
<b>Identifier</b>	QRDE-05
<b>Definition</b>	Identifies the dominant process technique used in the design And fabrication of the product
<b>Use</b>	To screen/search for these types of parts
<b>Formatting Information</b>	Character Field
<b>Example</b>	CMOS, BiCMOS, BiPolar, Silicon Germanium
<b>Query/Response</b>	Both

## 4.0 The ECIX QuickStart Program

### 4.1 Introduction

The ECIX QuickStart program is intended to provide ECIX and QRD CL1 technology and expertise to suppliers, customers, and to all ECIX end users who desire to adopt ECIX as a human-sensible and computer-sensible interchange mechanism for component information. The intention is to assemble a team of technologies and experts that can facilitate an easy and quick migration to ECIX.

Key elements of the QuickStart program include the following:

- Presentations on ECIX Standards, Methodologies and Technology
- ECIX Toolkit with reference implementations
- Software Consulting Services
- SGML/XML Consulting Services

Each of the elements of the ECIX QuickStart program is described in detail below.

### 4.2 Background

Currently ECIX expertise is limited to very few suppliers and OEM customers. The need to broaden the acceptance and adoption of ECIX standards quickly is the single most critical element leading to success of the ECIX standard.

It is easily observed that the "cost of entry" for suppliers and customers to adopt ECIX standards today is very high. To adopt ECIX if you are a supplier, companies must have or develop SGML/XML expertise, purchase or develop costly authoring and database tools, and find a business partner who wants to do business the ECIX way. If you are an end user company, again you need to acquire or develop SGML/XML expertise, and write software parsers for ECIX instances in order to get the data transferred to the point of use.

After considerable study and discussion, the ECIX CAB has determined that widespread adoption of the FIND & TRY portions of the component information access process (FIND, TRY, BUY, DESIGN, as described in section 1.0) would be a major accomplishment towards real industry adoption of the ECIX standards. The CAB feels that if we achieve adoption of FIND and TRY by a large number of suppliers and end customers, then normal process improvement will naturally lead to eventual broad support of BUY and DESIGN. So, we need to walk before we run.

At the same time, suppliers have invested millions of dollars in their current component information production systems, and we must find a way to "co-exist, while we migrate" to better ways of doing business. Support for FIND & TRY as defined by the CAB therefore supports the idea of pointers to additional information, including legacy data (especially the datasheet PDF) that has value to end customers. In time, additional supplier provided information should be contained in an ECIX data interchange.

But first, we must have some real success and real adoption by suppliers and customers.

The CAB believes that we need to produce a set of ECIX standards that encompass the component information data model, yet allow customers to "request the data they want, when they want it". These requests could be as granular as requesting a single piece of information from a supplier. However, as described in the CAB use model earlier in this document, customers require the FIND and TRY information (at a minimum) to enable basic search and retrieval paradigms for finding candidate components (or IP) for engineering design. Once candidate design objects have been located, additional information may be required and can then be requested.

The basic idea of the ECIX QuickStart program is to offer the suppliers and end customers the tools with which to get started quickly.

In order to attain rapid adoption of QRD CL1, end customers need to be able to build "requests" for data (in a standard query format), and suppliers need to be able to create ECIX instances which contain the requested data (in a standard response format). The attached "ECIX Compliance Level 1" diagram (i.e., QRD CL1) describes the key elements required to support the CAB use model.

QuickStart for suppliers is based on enabling new suppliers to quickly develop a set of minimal information about their products and at the same time, be able to reference existing information (such as a datasheet PDF). The coupling of QRD CL1 with available datasheets in PDF form will provide a very useful set of information about their products, which can support FIND & TRY.

Suppliers of ECIX information can and will realize the following benefits from QuickStart:

- Legacy Products can be migrated to ECIX standards and methodology quickly, and at a relatively low cost of entry
- Migration to a FULL implementation of ECIX can be accomplished as product volumes and business needs arise
- A more relaxed ECIX learning curve can be adopted
- Robust ECIX authoring tool investment can be made, as Return on Investment for the tool expenditure is quantified

Customers will also realize immediate value to their business process with QuickStart, including:

- The ability to quickly adopt the FIND & TRY paradigm with suppliers who are compliant to QRD CL1
- A set of tools that allows customers to quickly educate engineer and procurement personnel on ECIX
- A set of tools to supply the needed design information for early phases of design that can facilitate component (or IP) selection, evaluation, and improve product design cycles
- Access to consulting services to address software and/or SGML-XML requirements

#### **4.3 ECIX ToolKit**

Si2 has been interacting with the CAB to determine a common process for the searching and retrieval of ECIX information using the Internet. The results have been described as the "CAB use model" and are described earlier in this document. Fundamentally, this paradigm is a query/response model. The customer develops a query using a form-based user interface, submits the resulting query to one or more supplier companies, and gets back component information responses from suppliers who have matches to the query.

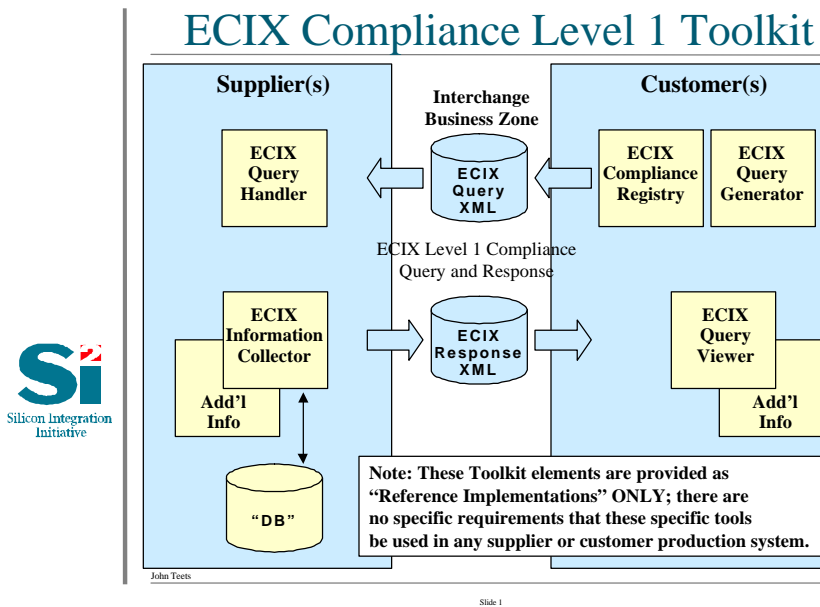
The "ECIX Compliance Level 1 Toolkit" diagram (i.e. QRD CL1 Toolkit) depicts several points in the process flow where tools are required. Tools for customers include:

- ECIX Query Generator
- ECIX Registry (of Suppliers and Customers)
- ECIX Query Viewer

- Additional Information Viewer

Also included in the diagram is the following supplier tools:

- ECIX Query handler
- ECIX Information Collector
- Additional Information handler



Descriptions of each of these toolkit elements now follow.

### 4.3.1 Elements of the ECIX Toolkit

It must be noted that the elements of the toolkit below are reference implementations only. While these tools in fact do work, and could be used for rapid adoption by customers and suppliers, they are not intended to replace or supplant commercial products that may be designed to achieve a much more robust solution in a production sense.

#### 4.3.1.1 Customer Toolkit Elements

These toolkit elements and reference implementations are designed and intended to enable the education and quick adoption of ECIX QRD CL1 by Customers.

#### 4.3.1.1.1 ECIX Query Generator

This toolkit element enables a design engineer or component engineer to enter information into a basic provided form. The form allows the input of a product commodity type as a minimum. Earlier in this document each commodity type was defined with a set of common and unique commodity search parameters. The requesting engineer or component engineer can specify search values for any individual or all of the commodity parameters. The form will list all potential values for common parameters, and additional parameters based on the commodity type. The Query Generator in its basic implementation will allow the customer to type the information, and/or select specific values using pick lists and other automated entry techniques.

Once the form has been completed to the satisfaction of the customer, the information is then converted to the ECIX standard QRD CL1 query format, and passed over the internet to the various supplier's ECIX Query Handler (see below).

#### 4.3.1.1.2 ECIX Level 1 Compliance Registry

Registration of ECIX QRD CL1 compliant suppliers can improve the customer search time experience. Registration would validate; before an active Internet search is invoked, a set of "registered as compliant" supplier Internet locations to which an ECIX query can be sent.

#### 4.3.1.1.3 ECIX Query Viewer

The Query Viewer will display the response information resulting from the search. At this point the customer can request additional searches or can ask for additional information on product searches already performed. For example, the customer could request that the datasheet (PDF) be downloaded. This can be accomplished using derivatives of the original query form. Using derivative forms will maintain the same human factors throughout the ECIX information process.

#### 4.3.1.1.4 Additional Information Viewer

The query viewer must also support the display of and requests for additional information that may be available for the commodity, especially the datasheet PDF. The additional information viewer mirrors the current Internet capability that points to a URL and supports downloading of file information.

#### *4.3.1.2 Supplier Toolkit Elements*

These toolkit elements and reference implementations are designed and intended to enable the education and quick adoption of ECIX QRD CL1 by Suppliers.

#### 4.3.1.2.1 ECIX Query Handler

The ECIX Query Handler can be viewed as the listener. The handler can either discriminate requests to be ECIX QRD CL1 requests, or the handler can be passed information in a variety of ways from a supplier's enterprise Internet function. Regardless of the function employed by the supplier, the handler passes the query to the "information collector".

#### 4.3.1.2.2 ECIX Information Collector

The Information Collector uses the ECIX QRD CL1 query to compare the available query information against the supplier's information base. As matches are found, the QRD CL1 responses are generated. Again, note that more than one supplier component may "match" the query.

Also, the required pointer to the PDFs, and any optional information to access additional Models, etc., are listed in the response to the query. The access method to additional information can be expressed in many ways, e.g., ftp site, contact name and telephone number, etc. The preferred way is to provide a persistent URL. If desired, the URL could be used by the customer to download the additional information link directly from the supplier web site. The completed query responses (note that more than 1 commodity can match the request) are sent back to the requestor. This function requires the collector be aware of the requestor's Internet address.

#### 4.3.1.2.3 ECIX QRD CL1 Authoring (Reference Implementation for Suppliers)

In order for suppliers to be capable of responding to ECIX QRD CL1 queries, some sort of response "authoring" is required. Commercial tools available in the marketplace may well be the best strategic approach to this requirement. However, in order to better understand what the query-response paradigm means, and to show it in operation, a reference implementation is planned for the ECIX Toolkit.

For QRD CL1 responses, suppliers will be provided a forms-based entry reference implementation (which will look and feel like a derivative of the ECIX query generator used by customers). This tool will support and require the supplier engineer to enter all the information required to be compliant to ECIX QRD CL1. Once this information is completed, it can be saved in a "database". See below for a reference implementation.

Of course, suppliers can in practice choose any desired method of authoring this information, and will undoubtedly do so. The reference implementation is presented primarily for "educational purposes", but it really works.

Independent of how responses get generated, a compliance checker is also needed to ensure that all the information meets the data requirements set forth in earlier sections. This tool will check a response file to ensure that it represents a ECIX level 1 compliant set of XML.

#### 4.3.1.2.4 ECIX QRD CL1 Database (Reference Implementation for Suppliers)

Suppliers will be required to place the information resulting from executing the ECIX authoring into a database accessible from the Internet by customers. Because each supplier and customer must be allowed to define a unique business relationship we cannot define a single operational situation. Instead we will work with some selected customers and suppliers to provide and document a reference implementation.

### **4.4 Consulting Services available as part of the ECIX QuickStart Program**

Each of the offerings described below are potential services available through the QuickStart program, and each of these services will be separately priced, and will have limited availability.

***4.4.1 ECIX QRD CL1 Authoring and Consultation Services***

Si2 will prepare and document a set of class material for use at supplier sites. The intent is to perform on-site education and consultation. The on-site education and on-site tool experiences will allow suppliers to produce ECIX instances within 1 week of receiving the education. Follow on consultation will be available using the Internet, telephone conferences and educated customer interactions.

***4.4.2 ECIX QRD CL1 Customer Education***

Si2 will prepare and document a set of class material for use at customer sites. The intent is to educate customers how to use the ECIX information process documented earlier. Also, Si2 will work with the customer to instruct them how to modify the base system supplied by Si2.

***4.4.3 ECIX Customer/Supplier Forum***

Si2 will construct an Internet-based forum page. Customers and suppliers can use the forum as a source of self help. Si2 will look at open issues and if the issues effect the perceived value of the standard will look for remedies and propose them.

***4.4.4 ECIX QRD CL1 Software Consulting***

Si2 will assist customers (both suppliers and end users) in obtaining professional software developers for ECIX-related software development. Si2 may have a limited staff available for such adoption efforts. Additional outside consultants may also be available.

***4.4.5 ECIX SGML/XML Consulting***

Si2 will assist customers (both suppliers and end users) in obtaining professional consulting regarding ECIX-related query-response development for XML-compliant interchange. Si2 may have a limited staff available for such adoption efforts. Additional outside consultants may also be available.