



Cat[®] Integrated Procurement (IP)

White Paper

Version 6

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Benefits and Requirements

Many customers are automating their procurement and invoicing processes and integrating with supplier systems to streamline their operations and reduce transaction costs. Since 2001 Caterpillar has been an industry leader in the integrated procurement of parts by facilitating hundreds of connections between customer business systems and their Cat[®] dealers. Customers who procure parts and receive electronic invoices through these connections often experience transaction cost savings of 50% or more, depending on their current processes. One customer's process assessment showed that over half of their manual process steps were eliminated during the following processes:

- ordering
- shipping/receiving
- invoice reconciliation
- accounts payable

Cat Integrated Procurement (IP) offers Cat dealer's customers:

- **Efficiency** – Orders are placed from the customer's business system to the Cat dealer's system, reducing the customer's manual effort and eliminating duplicate entry. Electronic invoices can then be sent by the Cat dealer to the customer's business system and automatically reconciled with the original purchase orders.
- **Order Accuracy** – Customers can select parts from several sources:
 - Caterpillar's online parts manuals,
 - Frequent order lists created within PartStore™ Web, or
 - Their own business system's list of Cat parts and prices.
- **Instant Information** – Customers receive parts prices and availability instantaneously, such as for emergency orders, even after hours.
- **Automated Stock Replenishment** – Customers with stocks of Cat parts and an appropriate system can automatically generate stock replenishment orders to the Cat dealer without manual intervention.
- **Cost Savings** – These benefits can result in significant transaction cost savings for customers.

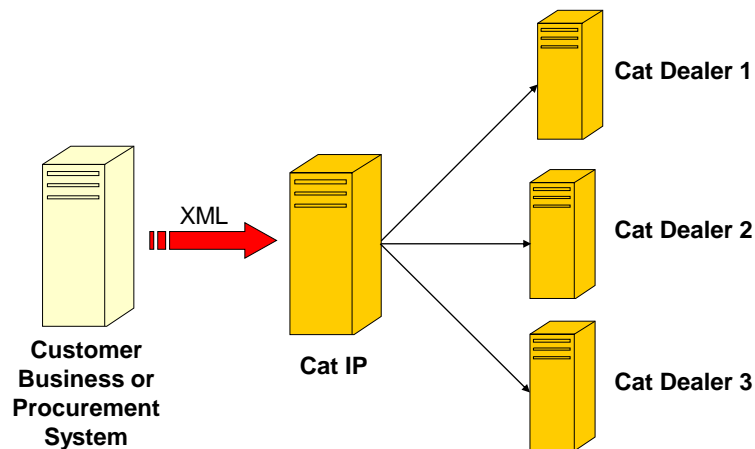
Customers who wish to pursue integrated procurement (also called IP or B2B) should have a relatively high volume of part orders with their Cat dealer(s) and a customer-based ERP (Enterprise Resource Planning) or procurement system with the ability to send and receive XML documents over the Internet via HTTPS. Given these requirements, customers can implement Cat IP within a few weeks to a few months, depending on their desire and commitment to reduce transaction costs.

Connecting Through Caterpillar's E-hub

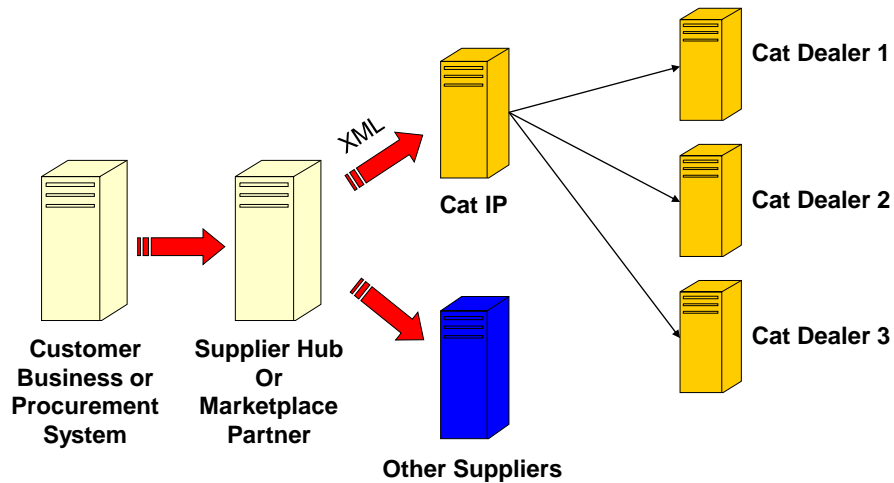
Cat IP is achieved using Caterpillar's e-hub which provides connection services, security, data manipulation, messaging, cross-referencing, and routing of several document types to over 100 Cat dealers worldwide. The e-hub receives values provided by a customer's business system in an XML order or inquiry, maps them to values needed by the Cat dealer business system, and routes them to the correct dealer. That process is reversed for electronic invoices from Cat dealers sent to customer systems.

Two Options for Connecting

Customers have two basic options for connecting to the Caterpillar system, either directly to the Caterpillar e-hub:



or through a third party supplier hub or marketplace partner:



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Customers deciding whether to use a direct connection or a supplier hub or marketplace partner should consider several factors. The choice can affect costs and should reflect the customer's ability to handle internet-based transactions, protocols, and connections. Also, customers should consider their e-business strategy, such as their need to integrate with multiple suppliers. Here are some of the advantages for each option:

Advantages with Direct Connection to the Caterpillar E-hub

- High availability, currently over 99%, due to a single connection point
- No transaction fees to a third party, which could be collected from both the customer and dealer and impact the transaction cost savings
- All Caterpillar e-hub services and connections are available without waiting for a third party to provide this access
- Management is potentially easier with fewer parties involved

Advantages with Connection through a Vendor Hub or Marketplace Partner

- Customer can utilize the same technical connection for multiple suppliers
- Less reliance on the customer's IT department to establish and maintain the connection
- Agreements can include other services or even full hardware and services outsourcing.

Note: if an organization is capable of connecting to a vendor hub or marketplace partner they may also be capable of a direct connection.

XML Formats and Security

Whichever connection is chosen, the e-hub provides the flexibility to accept and send a variety of XML formats depending on customer requirements. The most common XML formats sent through the e-hub are xCBL (XML Common Business Library) version 3.0 and cXML (commerce XML).

Communication to Cat IP is established using HTTPS and Caterpillar requires encryption provided by Transport Layer Security (TLS) v1. At the application level, Cat IP provides a Caterpillar Corporate Web Security (CWS) user ID and password. Exceptions can be made for some market sites that require other methods of security such as access control lists, shared secrets, or digital certificates.

Connection and Document Types

Customers can choose from a growing number of connection types and documents that are routed through Caterpillar's e-hub. These are not exclusive, so a customer can use one or all of them.

- **Direct Purchase Order (DO or PO)**
Customers send XML parts orders from their business system through the e-hub to the appropriate Cat dealer. It includes an immediate acknowledgement from the e-hub upon order receipt and can include a detailed response when the order is processed by the dealer, complete with shipping, taxes, totals, etc.
- **Caterpillar Hosted Catalog (PunchOut or OCI RoundTrip)**
A customer business or procurement system may be able to “punchout” to supplier hosted catalogs. Caterpillar hosts its own parts catalogs within PartStore Web and SIS (Service Information System) where a user can find part numbers in part manuals, exploded diagrams, frequent order lists, Planned Maintenance Checklists, etc. Caterpillar supports two protocols used by many procurement systems:
 - cXML PunchOut (used by Ariba[®] and Oracle[®] systems)
 - Open Catalog Interface (OCI) RoundTrip (used by SAP[®] systems)
- **Price and Availability Inquiry (P&A)**
Customer systems can use this inquiry to obtain parts prices and availability at their local dealer prior to sending a direct purchase order. It is often implemented in a similar way to that process. This inquiry may be implemented instead of the above “PunchOut” process or in addition to it.
- **Electronic Invoicing (e-Invoice)**
Customers can opt to have their Cat dealers send invoices either on paper or electronically or both. Customers experience the greatest cost savings when:
 - they use the above processes to ensure the original purchase orders are correct
 - their system is configured to automatically reconcile e-invoices with original purchase orders.

These connection and document types are more fully explained in the following sections. Some customers implement all of these types initially, while others implement just one or two and then add the others at a later date.

It should be noted that all commercial agreements such as specific pricing and payment terms are between the Cat dealers and customers, not between Caterpillar and customers.

Direct Purchase Order Process

Cat IP is able to process parts purchase orders generated by the customer's ERP system and return both an immediate acknowledgement that the order was received as well as a detailed order response when the Cat dealer processes the order. Some of the advantages to utilizing this service include:

- Elimination of manual orders and duplicate order entries into two systems
- Fewer data entry and part selection errors
- Seamless stock replenishment
- Reduced number of part returns to the Cat dealer

Direct Purchase Order

The customer's system should generate an XML purchase order with enough accurate data to place an order in the Cat dealer business system (DBS). The Caterpillar e-hub is flexible enough to map information the customer supplies to the information that the dealer's system requires, but each order or inquiry should include part numbers, quantities, and a purchase order number if required by the customer's system. Other required data could be set by default or sent with each order, such as customer account, shipping info, dealer store, name/email/phone, etc. Optional info sent with each order could include customer item number or part number, item notes, etc.

The e-Hub is capable of translating various XML formats, but the XML order or inquiry should be passed via HTTPS Post to the e-hub with a Caterpillar CWS (Corporate Web Security) username and password located in the header. The e-hub then initially validates the order and typically returns a message acknowledgement with either a status of success or with a description of any errors encountered.

Business rules established by the customer are then applied to each order, such as how to deal with backordered or replaced parts or invalid part numbers. It is customer's choice how the order should be handled in each case, if the order should be placed, rejected, revised, etc. The Caterpillar e-hub then transforms the order into a suitable format and routes it to the correct Cat dealer whose system processes the order. The e-hub can then send an order confirmation either directly to the customer system or via an email.

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Detailed Order Response

Cat IP can then send the customer system an order response that is a detailed confirmation of an order and may contain the following information as applicable:

- Status of the order (accepted or not or with amendments)
- Replaced parts information
- Backorder information
- Price changes
- Core charges
- Shipping charges
- Tax charges
- Total order amount

Some of the advantages to utilizing the detailed order response include:

- Confirmation of the order
- Ability to update the customer's ERP files with price and part number changes
- Notification of backorders
- Reconciliation with purchase orders, shipping notices, and invoices

The Caterpillar e-hub may send the detailed order response using the same connection as the order (synchronously) or via HTTPS Post from Cat IP to the customer's or their marketplace's web server (asynchronously). Asynchronous order responses are preferred in case any system is unavailable for order processing. Username and password can be sent in the order response within the HTTPS header if required by the receiving system. If the customer system does not accept order responses, they can be emailed to a customer's email address.

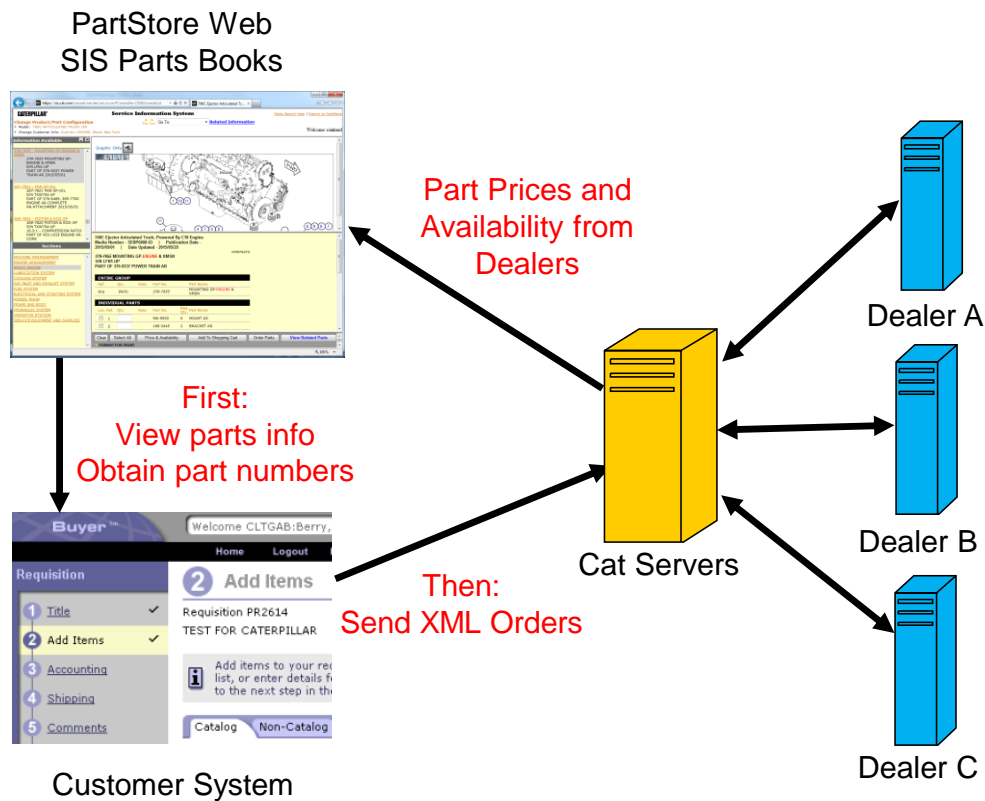
Caterpillar Hosted Catalog

Multiple Methods

Customers who need to look up Cat part numbers or other information prior to submitting an integrated procurement order can browse PartStore Web and the part manuals in SIS (Service Information System). To use this feature, the customer's business or procurement application must support one of two protocols:

- cXML PunchOut
- Open Catalog Interface (OCI) Roundtrip

The customer system can then be set up in advance to start an interactive PartStore Web session, where the user can choose parts from Caterpillar's detailed parts manuals, view part prices and availability, and return the shopping cart contents to their system for ordering.



The method selected depends on which business or procurement system is being used. Customers should contact their vendor for recommendations.

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Both methods give the user full functionality of PartStore Web and SIS to:

- Search for and select parts from detailed parts manuals updated nightly
- View real time price and availability from the dealer for each part selected
- Generate a parts list in the PartStore shopping cart
- Electronically receive the shopping cart for ordering in their system

Because the shopping cart contents are electronically returned to the customer's system, which can then submit an electronic purchase order to Cat IP, multiple benefits can be realized when implementing this process:

- Duplicate data entries are eliminated as the selected parts list is returned to the customer's system.
- Part list processing is integrated with the customer's ERP system, which can facilitate customer defined ERP controls on orders.
- Errors are reduced which increases on-time order fulfillment
- Part returns to the dealer are minimized since the correct part can be selected from Caterpillar's detailed parts manuals.

Price and Availability

Similarities and Differences to Direct Purchase Order

A customer can send a parts price and availability inquiry, generated by the customer's system, prior to ordering parts. This process is similar to the direct purchase order process discussed previously. The inquiry is submitted to the e-hub using the same method (HTTPS) and possibly to the same URL that the customer uses for the transmission of purchase order documents. When the e-hub detects that it is a price and availability inquiry, it will not transmit the document to the Cat dealer as a purchase order. Instead the e-hub will retrieve current price and availability information from the Cat dealer for each valid line item in the document and return that information to the customer.

The Price & Availability Inquiry document will have the following differences from a direct purchase order document:

- A purchase order number is not required.
- Shipping information is not required. However, if the document contains a valid shipping method, then the inquiry response may contain shipping charges.
- Order quantity is not required. If the order quantity for a line item is missing or invalid, then price and availability will be returned for a quantity of one; otherwise, price and availability information will be returned for the quantity specified.
- A line item without a part number will not cause the entire inquiry to fail (although some customers request that an order fails if any part numbers are missing). The items without part numbers will not be processed, but price and availability information will be returned for any other valid line items.

Cat IP will authenticate a price and availability inquiry in the same way that it authenticates a parts purchase order transaction from the customer. For that reason, if required, the HTTPS header must contain the same Caterpillar Corporate Web Security (CWS) user id and password that the customer uses for the authentication of purchase order transactions.

The response document will be returned synchronously, through the same HTTPS connection that is used to send the price and availability inquiry document, unless the customer requests an asynchronous response.

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Additional Price and Availability Information

Replaced Part

If any of the part numbers in the price and availability inquiry have been replaced and are no longer available, the replacement items and their current prices and availability will be contained in the response.

Alternate Part

Alternate parts are parts that could be used instead of the original parts requested and can include remanufactured or used parts. If any alternate parts are available for any of the ordered parts, the alternate items and their current prices and availability will also be contained in the response.

Back orders

In addition to the current price for each valid line item, the price and availability response will contain the amount of the item on hand plus detailed availability information for any back ordered quantity. This includes the dealer stores or Caterpillar facilities at which a back order would have been placed if a purchase order had been created at the same time that the inquiry was made. This information consists of the following:

1. Store number or facility code. This is the code representing the dealer store or Caterpillar facility where the back order would have been placed.
2. Store or facility name. This is the name of the dealer store or Caterpillar facility at which the back order would have been placed.
3. The Cat dealer's description for availability.
4. The quantity that would have been back ordered from the store or facility.
5. Some dealers may include the freight that would have been charged, so you can see it up front rather than just on invoicing.

It is possible for a back order to be placed at more than one dealer store or Caterpillar facility for a single line item. In that case, the price and availability response will contain more than one set of detailed availability information for that item.

If xCBL 3.5 is not Supported

While an inquiry may be sent in xCBL version 3.0, the response will be returned to the customer in an xCBL 3.5 Order Response document since xCBL 3.0 does not contain detailed availability information. If the customer does not support xCBL 3.5 Order Response, Cat IP can convert the price and availability response to an xCBL 3.0 order response document which will contain only the price and back order quantity.

Electronic Invoice

Customers can receive electronic invoices from their Cat dealer with all the information typically contained in their paper invoices. It can include the following invoice information:

- Detailed line item information
- Core charges and information used for core management within the customer's ERP system
- Shipping Charges
- Taxes
- Other charges (miscellaneous)
- Remit-To address information
- Terms and discounts
- Final payment due amount

Electronic invoicing also includes the following features:

- Customers may choose to receive separate invoices for each shipment of parts or one invoice for an entire order (choice should be conveyed to Cat dealer).
- Customers may choose to receive electronic invoices only, paper invoices only, or both electronic and paper invoices.
- If a customer chooses to receive electronic invoices, all parts invoices will be electronically sent whether the order was placed via Cat IP, PartStore Web, Parts.cat.com, phone, fax, or at the Cat dealer parts counter.

Here are some of the advantages to electronic invoicing:

- Invoice is sent to accounts payable electronically, reducing transaction costs and minimizing errors associated with handling paper invoices
- Invoices can be automatically reconciled against the original purchase order or detailed order response
- Invoices contain information that customers can utilize with their core management processes

Invoices are sent via XML to the customer's port and URL of choice from the Caterpillar e-hub in an HTTPS post. Authentication with a username and password in the HTTPS header is at the discretion of the recipient of this post. Cat IP will expect a message acknowledgement referring to the posted e-invoice and will not consider the sending of the e-invoice successful until it is received.

Connection and Mapping Services

Once a customer has made the decision to move forward with a connection project, the customer, Cat dealer, supplier hub or marketplace (if applicable), and the Cat IP team will work together to resolve all business process and technological gaps to integrate the customer's system with their Cat dealer's system. The Cat IP team will:

- help map current and/or future procurement processes
- aid in defining and resolving business and technological gaps
- provide specific connection information
- track and manage the resolution of issues
- offer system mapping services (see below) as necessary
- provide testing guidelines and a testing environment
- facilitate moving into a production environment

Gaps may be identified while mapping the values that a customer's system can provide to the values that the Cat dealer requires. Cat IP has the capacity and flexibility to offer individual mapping solutions for each customer. The Cat IP team determines when to apply a custom mapping solution during the data gap analysis while engaged in the connection effort. The Cat IP solution can include cross-referencing, preference lists, and default data as needed.

Please note that there is no charge to a customer from Caterpillar for any of these services.

Customers often ask what ERP systems or marketplaces can connect to the Caterpillar e-hub. There is no limitation as long as the system or marketplace has basic procurement functionality and the ability to send and receive XML documents over the Internet. The e-hub's capabilities have been made flexible to accommodate differences in connections and business systems. Some of the systems or marketplaces that have connections with Cat IP include: Oracle[®], SAP[®], Quadrem[®], Ariba[®], PeopleSoft[®], and JD Edwards[®].

Additional information can be provided to interested parties including:

- Detailed technical information for mapping and cross-referencing
- XML formats used and example XML documents

In addition, teleconferences and on-site presentations can be arranged to explain the many aspects of Cat IP and understand a customer's current and future procurement processes. For more information, please contact your local Cat dealer or go to <http://www.cat.com/ip>.

Acronym Glossary

B2B – Business to Business, another term for IP (Integrated Procurement) but also refers to any exchange between two businesses rather than between consumers and businesses

cXML – commerce XML, used to standardize the exchange of catalog content, such as Ariba's PunchOut, and as a streamlined version of XML for business documents and procurement applications (<http://www.cxml.org>)

CWS – Corporate Web Security, Caterpillar's system to provide a standard method for the owners of Web based content and applications to restrict access to some or all of their content

Cat IP – Cat Integrated Procurement, Caterpillar's integrated procurement solution provided to its dealers

DBS – Dealer Business System, one of several business systems used by Cat dealers

ERP – Enterprise Resource Planning, generic name for a business management system used for planning, procurement, sales, marketing, accounting, etc.

HTTPS – HyperText Transfer Protocol Secure, version of HTTP that encrypts data using the Transport Layer Security (TLS) v1 protocol.

IP – Integrated Procurement, business-to-business (B2B) integration of a customer's e-procurement or ERP system with a supplier's business system for the purchase of supplies and services (IP can also mean Internet Protocol)

OCI RT– Open Catalog Interface RoundTrip, standard to provide integration of catalog data, used for SAP's EBP (Enterprise Buyer Professional procurement application)

PSIP – PartStore Integrated Procurement – previous name for Cat IP.

SIS – Service Information System – Caterpillar's electronic service tool containing parts and service information for all Caterpillar products since 1977.

TLS - Transport Layer Security and its predecessor, Secure Sockets Layer (SSL), are cryptographic protocols designed to provide communications security over a computer network.

URL – Uniform Resource Locator, the Web address for a site, image, document, etc. found on the Internet or some other network

xCBL – XML Common Business Library, the pre-eminent XML component library for business-to-business e-commerce (<http://www.xcbl.org>)

XML – Extensible Markup Language, a language for the web that is more flexible than HTML and uses data tags to define the type of data contained within the tags (<http://www.xml.org>)