Transforming Warranty Processes with the IBM Warranty Analytics Solution

IBM Redbooks Solution Guide

The IBM® Warranty Analytics solution helps companies automatically integrate great volumes of warranty-related data from across the enterprise and apply advanced analytics to learn where warranty-eligible defects are arising, why they are occurring, and even whether fraud might be driving some claims. The power of the solution derives from its use of innovative IBM analytic techniques and the wide variety of data it can analyze, including customer complaints, call center records, product data, sales reports, maintenance logs, and service technician notes.

The new solution uses IBM Predictive Maintenance and Quality (PMQ) to uncover hidden trends and predict future product failures. It also uses IBM Case Manager for efficient warranty claim processing, and, optionally, IBM Counter Fraud Management for fraud detection. Merged into a single solution, these powerful tools can help you manage virtually every aspect of your warranty program:

- Reduce warranty claims by identifying and resolving quality and delivery issues early in the product lifecycle.
- Improve customer satisfaction and brand image by offering more reliable products and more attractive warranty terms.
- Focus on proactive maintenance at identified failure points to minimize overall asset maintenance costs and help push more products to market.
- Detect fraudulent warranty claim patterns so that you can reject them and develop appropriate policies and controls for future claims.

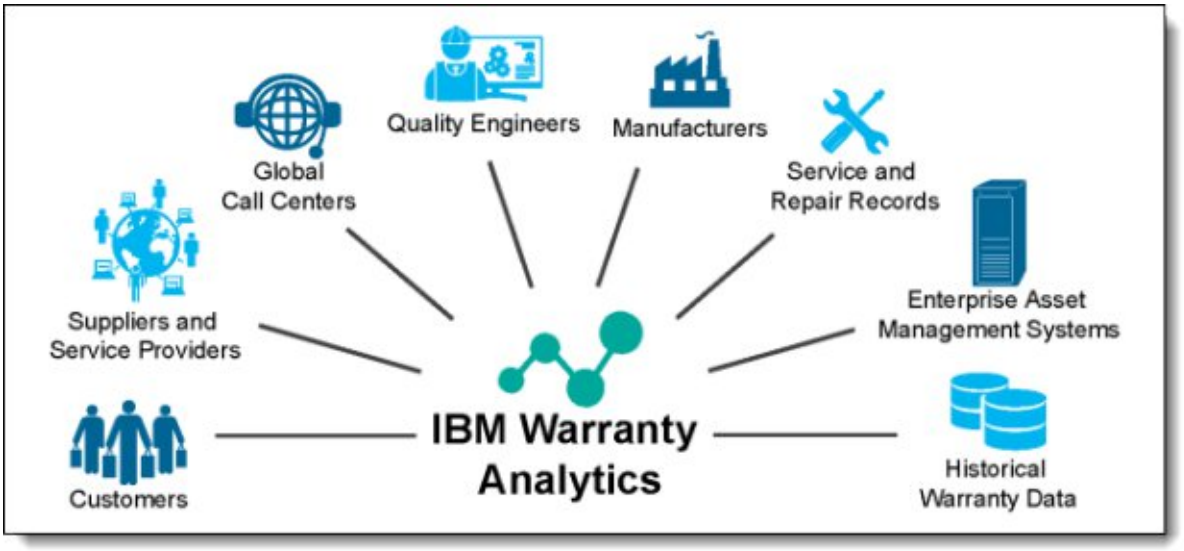

Figure 1 System context of the IBM Warranty Analytics Solution

Did you know?

Technology analysts rank IBM as a leader in case management and predictive analytics.[1] The Warranty Analytics solution is supported by IBM's deep industry and process expertise, software and hardware offerings, cloud provisioning models, and advanced analytics and optimization capabilities. In addition, IBM consultants can work with you to assess your current warranty claim processing issues and demonstrate the solution's capabilities based on your company's own historical warranty data.

Business value

Analyzing warranty data is a complex challenge for companies because the needed insights are often hidden deep within historical claims records. Yet significant cost savings are possible when a detailed examination of claims, including predictive analysis, uncovers warranty fraud, persistent production flaws, errors in published warranty terms, or new ways of resolving product issues faster than before.

The Warranty Analytics solution has applications in virtually all industries. Here are some examples of how different kinds of companies can benefit from the solution:

- **Recover the cost of warranty-related parts failures from suppliers**

  Sometimes, a faulty part from a supplier causes a problem that leads to a warranty claim. So the manufacturer would like to recover the expense of the claim from the supplier.

  IBM Warranty Analytics provides the analytical infrastructure to identify the root cause of a problem, the responsible part or parts, and, if applicable, the supplier. These details can help a manufacturer in seeking to recoup the expense of a claim (if such recovery is part of the supplier's contract).

- **Detect and reduce fraudulent claims and related risks**

  Warranty fraud confronts nearly every manufacturer at some point. The cost can be enormous.

  IBM Warranty Analytics can be integrated with the IBM Counter Fraud Management solution to support fraud detection. By defining, applying, and refining certain fraud identification rules during claim processing, organizations can quickly identify abnormal claim patterns, reject fraudulent claims, and then alter claim processes and policies to prevent similar problems in the future.

- **Determine optimum durations and conditions for warranty coverage**

  Companies must realistically estimate the length of time a product should be covered under a warranty and the acceptable conditions under which it can be used. If warranty coverage is too short or the conditions too restrictive, customers might not buy the product. But if coverage is too long or the conditions too open-ended, warranty claim payouts will be unaffordable.

  The solution can analyze multiple variables that affect a product's behavior and life span. The resulting insight helps manufacturers design appropriate warranty coverage for each product, addressing concerns such as term length and operating conditions (such as, maximum loads, temperatures, pressure ranges, and so on).

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[1] *Magic Quadrant for Enterprise Content Management*, Gartner, Inc. (Sept 2014), http://www.gartner.com/technology/reprints.do?id=1-22DOTDU&ct=140929&st=sb

Predictive Analytics: Hurwitz - Advanced Analytics: The Hurwitz Victory Index Report, http://ibmurl.hursley.ibm.com/NA16

- **Accurately estimate the cost of specific warranties and terms**

  Warranty costs must be estimated and budgets allocated to cover them. So warranty planning must cover a number of factors, starting with whether it will be more cost-effective to repair the product or replace it. Then, the company can determine the type of warranty to be offered, its duration, and how much money will need to be budgeted to cover claims.

  The Warranty Analytics solution can help identify historical patterns and create reports projecting different approaches to warranties for particular products. This same analysis can be extended to questions, such as whether to offer consumers insurance to cover specific parts that might be more prone to failure, and therefore not appropriate for traditional warranty coverage.

- **Perform root cause analysis on warranty -eligible failures**

  After a warranty is offered, most companies seek to minimize claim-related expenses by identifying why certain products are failing and invoking warranty coverage more than others. Laboratory testing can be helpful, but often the true causes of product failures can only be found through advanced data analysis to uncover otherwise hidden trends over a long period of time.

  IBM Warranty Analytics complements traditional approaches to root cause analysis. It helps you dive more deeply into your warranty data with capabilities such as regression models, trend analysis, and preconfigured reports that can be customized for specific business needs.

- **Improve customer satisfaction**

  Warranty programs are directly linked to customer satisfaction. If consumers believe a company treats them fairly when products fail to live up to expectations, they will typically buy more of the company's products in the future, building brand loyalty.

  Applying predictive analytics on warranty claims data helps identify product failure patterns and usage conditions that correlate with such failures. In this way, IBM Warranty Analytics can enable a manufacturer to recall and service parts before they fail.

- **Reduce claim volume through improved product quality**

  All enterprises strive to minimize warranty claims where possible. So they must reduce or eliminate the product-related issues that result in warranty claims.

  By using IBM Warranty Analytics to feed the results of claims analysis into the planning and design of future product iterations, quality can be improved over time. This helps ensure that the most meaningful improvements are made first, and that better products, which will cause fewer warranty claims, can go out into the marketplace faster.

Solution overview

Table 1 lists the high-level end-to-end process flow of IBM Warranty Analytics solution.

Table 1 Functional capabilities of the solution

Create a warranty claim	The process starts with initiation of a warranty claim in response to a customer complaint. Key information is gathered in this step, such as a problem description, the conditions under which the problem occurred, how and when the covered item was purchased, and details about the customer. The claim record can include additional artifacts such as photographs submitted by the customer, when applicable.
Analyze the claim	The claim information is then analyzed, both in terms of the failure reported by the customer and any past claims by other customers about the same product or component. The goal is to discover any unusual failure patterns (random or otherwise) that are tied to specific product attributes or ways in which it is used. Various analytical models are executed and reports are generated regarding the cause of the failure, correlations with past claims, and recommended next steps, if any. If IBM Counter Fraud Management is integrated with the solution, this part of the process also seeks to identify if the claim (and possibly past ones with similar failures) might be fraudulent.
Respond to the claim	The company next responds to the claim based on the analytical findings. This involves both automated actions within the solution (such as retrieval of business documents and validation), and actions taken by company employees responsible for warranty programs (such as reviews and approvals). Responses can include accepting or rejecting the claim, providing a replacement product or component parts, and related activities such as ordering the needed replacement parts from a supplier, if they are not already available to ship to the customer.
Predict warranty scenarios	Even after a claim is resolved, analysis can continue by applying additional models aimed at predicting future potential failures or evaluating the costs and benefits of adopting different methods of responding to future, similar claims. In response, the manufacturer can set aside funds to pay the future claims, pro-actively recall products that are likely to fail, or pursue other mitigation options. These predictive models can also provide important information to help engineering teams modify their product designs to avoid the identified problems.

These functional capabilities are depicted in the top portion of Figure 2.

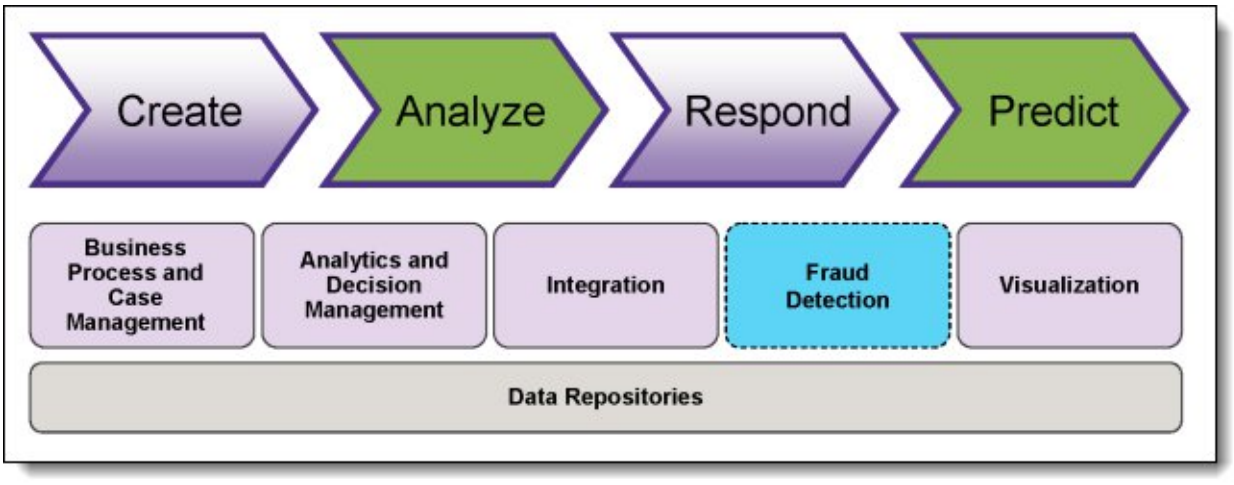

Figure 2 Functional capabilities and logical components of the IBM Warranty Analytics solution

Figure 2 also shows the logical components that support the solution's various capabilities. Each component is responsible for a particular aspect of warranty analytics.

Business Process and Case Management

This component supports warranty service case creation, execution, and management. It includes an end-to-end claim process workflow with support for work order creation and processing, such as when a claim is approved and an order is issued to ship a replacement part to the consumer. The warranty case file can include both structured data, such as from online forms, and unstructured data, such as email attachments containing handwritten notes or pictures.

Analytics and Decision Management

This component provides analytical capabilities to examine the data associated with new and historical warranty claims. The key to this part of the process is identifying any links (whether correlative and causative) between the reported product failure and other factors such as processing history, who supplied the component parts, the facility where the product was manufactured, how it was used by the consumer, and so on.

Integration

This component provides the needed integration with back-end systems such as the solution's data repository or other warranty-related databases. It also governs integration with external systems (for example, SAP, Oracle JD, and IBM Maximo®) and systems maintained by the various parts suppliers, retailers, and others involved in the warranty claim chain. In this way, if a product failure is due to a supplied component, a service request can be sent to the appropriate supplier to research the problem and determine appropriate responsive actions.

Fraud Detection

This optional component uses the patterns discovered in the analysis phase to detect and reject specific claims that are determined to be knowingly false or when the claimant is not eligible for coverage. It does this by establishing correlations with various parameters that were linked to fraud in past claims or by applying predefined rules to establish the legitimacy of a claim. When human intervention is required, the fraud detection component issues alerts to appropriate personnel within the company.

Data Repository

This component serves to capture, store, and manage the widest possible range of information related to a warranty claim. This can include the claim itself, supporting documentation, call center records, details about the product and its component parts, transactional data regarding the consumer's purchase of the product, and even the notes of service technicians who attempted to fix the failed product. The data is controlled by the business unit that is responsible for warranties, but it can be accessed by authorized users in other areas, such as product engineering, manufacturing, procurement, legal, and finance.

Visualization

The business intelligence component of the solution provides reports and dashboards that help users visualize various details about a warranty program, including total claims, acceptance and rejection rates, costs and outcomes of different warranty programs, and so on. Reports can be generated about specific claims (or groups or related claims) as a means of spotting new trends, whether positive or negative.

Solution architecture

Warranty Analytics is implemented through the combination of IBM Case Manager and IBM Predictive Maintenance and Quality, along with options such as IBM Counter Fraud Management.

IBM Case Manager

Warranty claims depend on many types of physical and electronic documentation. IBM Case Manager provides the document-centric workflow needed to manage claims and related analytical processes.

Several features of Case Manager play important roles in IBM Warranty Analytics:

- IBM Case Manager provides a content and process platform for case data, case-related tasks, reporting capabilities, and workflows for managing structured and unstructured documents (such as, form data, emails, scanned pages, photos, and so on). It includes document lifecycle capabilities, such as versioning, security, records management, and searchable document metadata.

- IBM Case Manager Builder provides a single system for defining all aspects of a case or claim. Case files can contain all associated evidence and supporting data.

- IBM Content Analytics with Enterprise Search is used to analyze and visually explore large volumes of unstructured content. Text data can be examined using natural language processing features.

- IBM Content Navigator provides the user experience and display functions for the Case Manager client. Mobile workers can have full access to warranty case files and related content through the Case Manager mobile client.

IBM Case Manager is deployed in an application server and uses IBM FileNet® P8 to access and store content and warranty cases. You can also integrate IBM Watson™ Explorer Advanced for sophisticated content exploration and data mining.

IBM Predictive Maintenance and Quality

The solution's deep analytical capabilities are provided by IBM Predictive Maintenance and Quality. Among the features of PMQ is a pre-built use case called the *Quality Early Warning System*, which provides several warranty-related scenarios that can help accelerate your adoption of warranty analytics.

Several features of PMQ play important roles in IBM Warranty Analytics:

- IBM SPSS® tool suite:
    - SPSS Modeler, SPSS Collaboration & Deployment Services, and Modeler Server: These products, collectively, are used to create the statistical models needed to analyze warranty data.
    - SPSS Decision Management: This product provides a workbench with which an analyst can review analytical results and determine appropriate responses based on business rules (whether predefined in the product or written by the analyst).

- IBM Cognos® Business Intelligence: This product extends the regular reporting capabilities of Case Manager and PMQ with advanced features, such as detailed analytical visualizations and dashboards.

- IBM Integration Bus: This product provides the PMQ solution's event processing capabilities, both in batch mode and in real time. For warranty claims, this typically involves preparing the data to be studied and then invoking various SPSS models to perform the analysis.

IBM Counter Fraud Management

IBM Counter Fraud Management is an optional product that works with Case Manager to help identify claims that fall into unusual patterns that might indicate fraud. With Counter Fraud Management, you can define rules for identifying certain claims as suspicious and recommend responsive steps, including human intervention to investigate the submitted claim.

The IBM Warranty Analytics solution architecture is depicted in Figure 3.

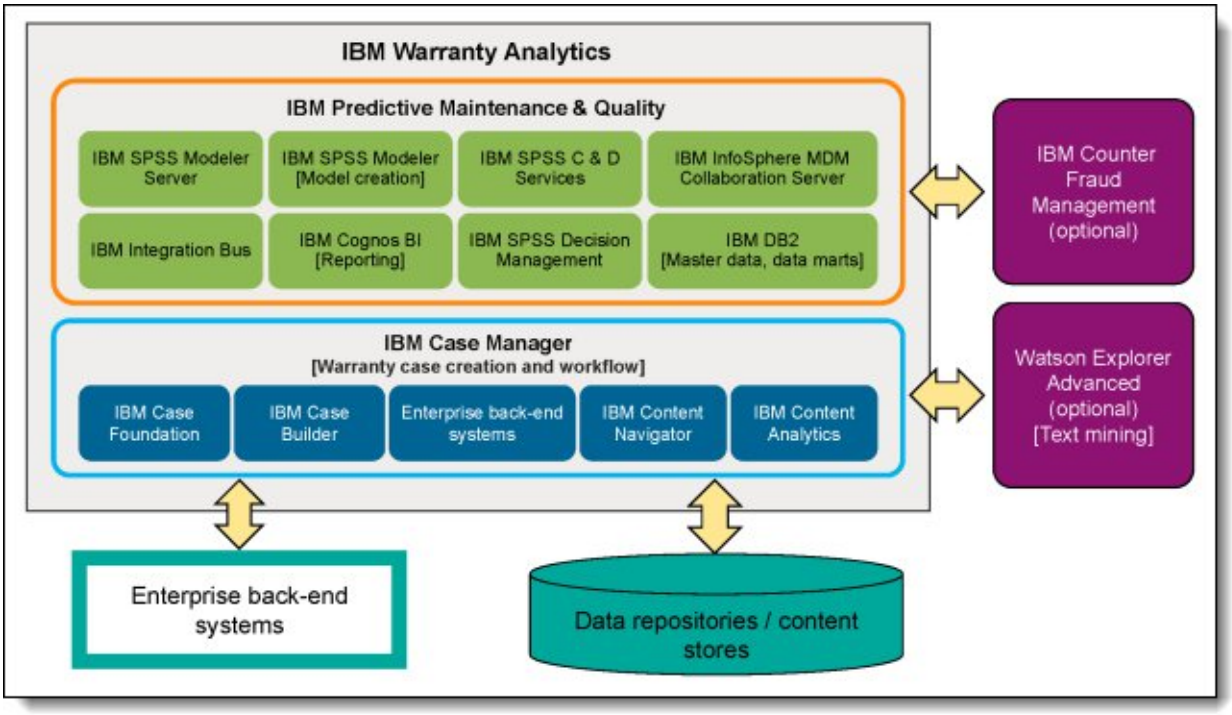

Figure 3 Architecture of the IBM Warranty Analytics solution

Usage scenarios

IBM Warranty Analytics has various applications in an enterprise environment and will be used by individuals in all of the major job roles involved in managing a company's warranty programs:

- Consumer
- Customer service representative
- Claim processor
- Fraud investigator
- Data scientist
- Database administrator
- Business analyst
- Warranty program manager

Table 2 provides some typical scenarios for using IBM Warranty Analytics to process warranty claims.

Table 2 Typical uses of the IBM Warranty Analytics solution

Scenario	Initiating system/role	Description
Open a warranty claim	Consumer; customer service representative	When a consumer reports a defective product, a customer service representative (CSR) initiates a warranty claim by executing an Open Warranty Claim task in IBM Case Manager. The CSR enters all appropriate details (date of purchase, date of failure, type of failure, and so on) into a new case object that is based on a predefined warranty case template. After the case attributes are defined and supporting documents are attached to the case, the CSR completes the task, which triggers the next task in case management workflow.
Process a warranty claim	Claim processor	The Case Manager workflow can automatically assign each new claim to a specific workgroup based on predefined rules. Each claim processor uses Case Manager interface widgets to view the tasks assigned to him. Depending on the complexity of each claim, the processor can trigger appropriate follow-up actions by pursuing one or more of these steps: ● Analyze the claim (with possible root cause analysis) ● Reject or close the claim, or request additional information about it ● Investigate the claim for possible fraud ● Approve the claim for the payment ● Determine that a parts supplier should pay the claim ● Escalate the claim to a supervisor
Run analytical models on warranty claims data	Warranty program manager, database administrator, data scientist	Warranty program managers often want to perform deep analysis on warranty claims. IBM Warranty Analytics supports this work, provided that the master data has been properly configured in the IBM Predictive Maintenance and Quality database. To begin, a database administrator uses a combination of Case Manager tools and custom scripts to export a useful slice of warranty data, either as a disk-based file or in the form of data marts. Meanwhile, a data scientist configures analytical models with suitable runtime parameters and deploys them to perform the requested analysis. If the data to be studied includes textual information, the data scientist can also configure IBM Watson Explorer to find interesting patterns within that text or any unstructured data, such as might be contained in case documents, comments, and metadata. The event processing component in PMQ then processes the request and works with IBM SPSS (a component of PMQ) to invoke and run the analytical models to identify hidden correlations with warranty claim variables.
Generate reports on warranty claims data	Warranty program manager, business analyst	Warranty program managers also sometimes want to see reports and other visualizations of warranty claims data. To provide these views, a business analyst logs in to Cognos Business Intelligence, where the needed reports, dashboards, and so on, are created. If a claim processor suspects fraud in a particular claim, or when analysis of claims data finds patterns that could indicate fraud, a new Case Manager task can be initiated to send the claim on to the optional Counter Fraud Management component, assuming it is part of the deployed solution.
Investigate a claim for possible fraud (optional)	Claim processor, fraud investigator	If a claim processor suspects fraud in a particular claim, or when analysis of claims data finds patterns that could indicate fraud, a new task can be initiated to send the claim to the optional Counter Fraud Management component, if it is part of the deployed solution. Counter Fraud Management applies various business rules to detect anomalous behavior and, if it finds something, sends prioritized alerts to the company's designated fraud investigator. The fraud investigator then uses the tools provided to confirm or reject the suspected fraudulent activity, after which updates are sent back to Case Manager to state whether the claim was approved, denied, or something else.

Integration

IBM Warranty Analytics provides the core functions needed to create, process, and analyze a warranty claim. It can also be integrated with IBM Counter Fraud Management and IBM Watson Explorer Advanced, as explained previously in this document.

Additional integration options can extend the solution for even broader applications across an enterprise. Here are some of these options, which are illustrated in Figure 4:

Back-end application integration

Warranty data and related analytical insights can be used to update records in many back-end systems. This includes product data management (PDM) systems, customer relationship management (CRM) systems, and systems that support financial planning, manufacturing processes and planning, and supply chain management.

Business process integration

A warranty workflow can be integrated with other business processes based in different systems. The process choreography to manage this integration can be fulfilled by IBM Business Process Manager in conjunction with Case Manager.

Engineering lifecycle integration

Warranty programs exist within a product's operational lifecycle, but the results of warranty analytics can serve as reference data for engineering lifecycle applications, where they can help with proactive defect and change management. IBM Rational® Engineering Lifecycle Management (RELM) is one such potential integration option.

Asset lifecycle integration

PMQ includes prebuilt predictive models that support integration with the IBM Maximo enterprise asset management system. PMQ users can create, update, and follow up on work orders in Maximo.

Master data management integration

PMQ can import master data from IBM Master Data Management. Up-to-date master data is critical for accurate data interpretation and analytics.

Business partner integration

Some warranty-related failures can be isolated to a component provided by a supplier. So integration with supplier systems is advisable, whether for purposes of retrieving engineering data, sharing analytics and test results, or to engage in collaborative design efforts. Integration options include a combination of IBM Sterling B2B Integrator, RELM, and IBM Connections.

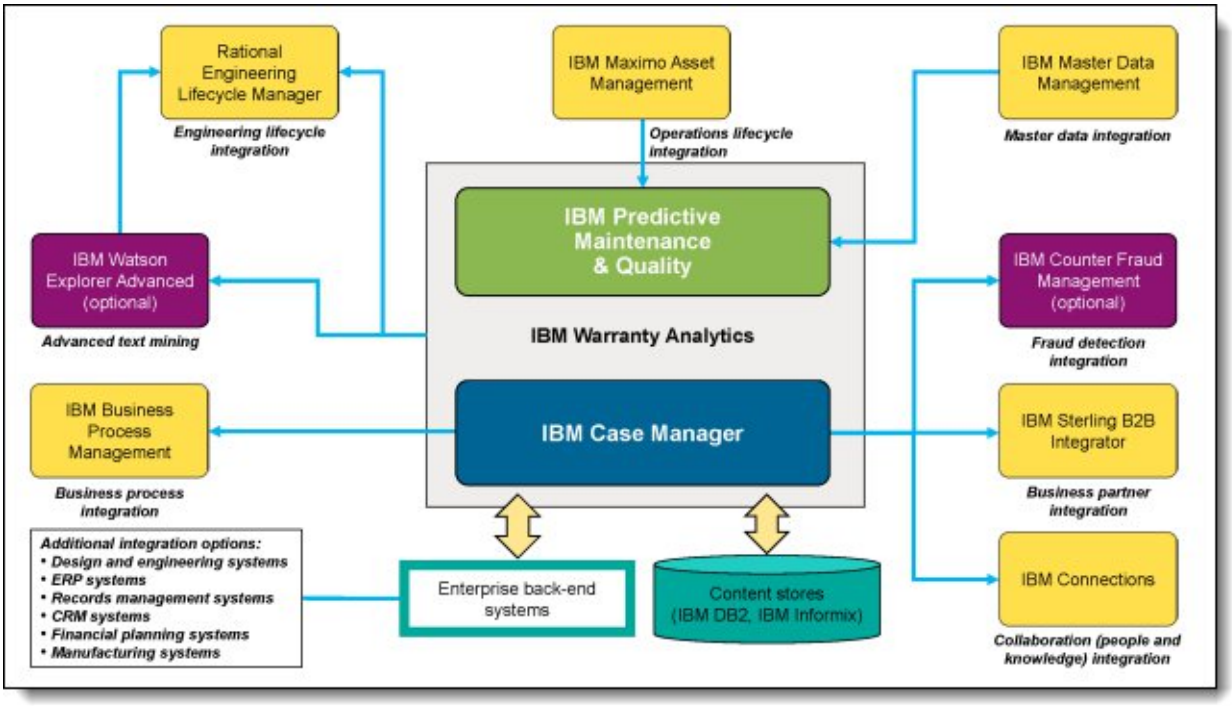

Figure 4 Integration options for the IBM Warranty Analytics solution

Supported platforms

Platform support is dependent upon the specific component product of the Warranty Analytics solution that is being discussed. For the most up-to-date information about supported platforms, refer to the product documentation URLs in the "Related information" section.

Ordering information

For information about ordering the products that make up IBM Warranty Analytics, refer to the web pages listed in Table 3. Each page includes contact information that you can use to initiate a discussion with a qualified IBM representative regarding your specific warranty analytics needs.

Table 3 Ordering information for the IBM Warranty Analytics solution

Product	URL
Aerospace and defense	http://www-935.ibm.com/industries/aerospacedefense
Automotive	http://www-935.ibm.com/industries/automotive
Electronics	http://www-935.ibm.com/industries/electronics
Consumer products	http://www-935.ibm.com/industries/consumerproducts
Additional industries	http://www-935.ibm.com/industries

Related information

For more information about the IBM Warranty Analytics solution and its component products, refer to these locations:

- **IBM Case Manager:**
  - Product page: http://www-03.ibm.com/software/products/en/category/advanced-case-management
  - *Advanced Case Management with IBM Case Manager* (IBM Redbooks® publication): http://w3.itso.ibm.com/abstracts/sg247929.html?Open
  - *Creating Robust and Effective Claims Solutions with IBM Case Manager* (IBM Redbooks publication): http://w3.itso.ibm.com/abstracts/tips1146.html?Open
  - IBM Knowledge Center: http://ibmurl.hursley.ibm.com/N9QU
- **IBM Predictive Maintenance and Quality:**
  - Product page: http://www-03.ibm.com/software/products/en/predictive-maintenance-quality
  - *IBM Predictive Maintenance and Quality 2.0* (IBM Redbooks publication): http://www.redbooks.ibm.com/abstracts/tips1130.html
  - *IBM Predictive Maintenance and Quality Technical Overview* (IBM Redbooks publication): http://www.redbooks.ibm.com/redpieces/abstracts/redp5035.html
  - IBM Knowledge Center: http://ibmurl.hursley.ibm.com/N9QV
- **IBM Counter Fraud Management:**
  - Product Page: http://www-03.ibm.com/security/counter-fraud/solution/index.html
- **IBM Watson Explorer:**
  - Product page: http://www.ibm.com/analytics/watson-analytics
  - *IBM Watson Content Analytics: Discovering Actionable Insight from Your Content* (IBM Redbooks publication): http://www.redbooks.ibm.com/abstracts/sg247877.html?Open
  - IBM Knowledge Center: http://ibmurl.hursley.ibm.com/N9QW

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