# CS 553 Spring 2004

Web service descriptions

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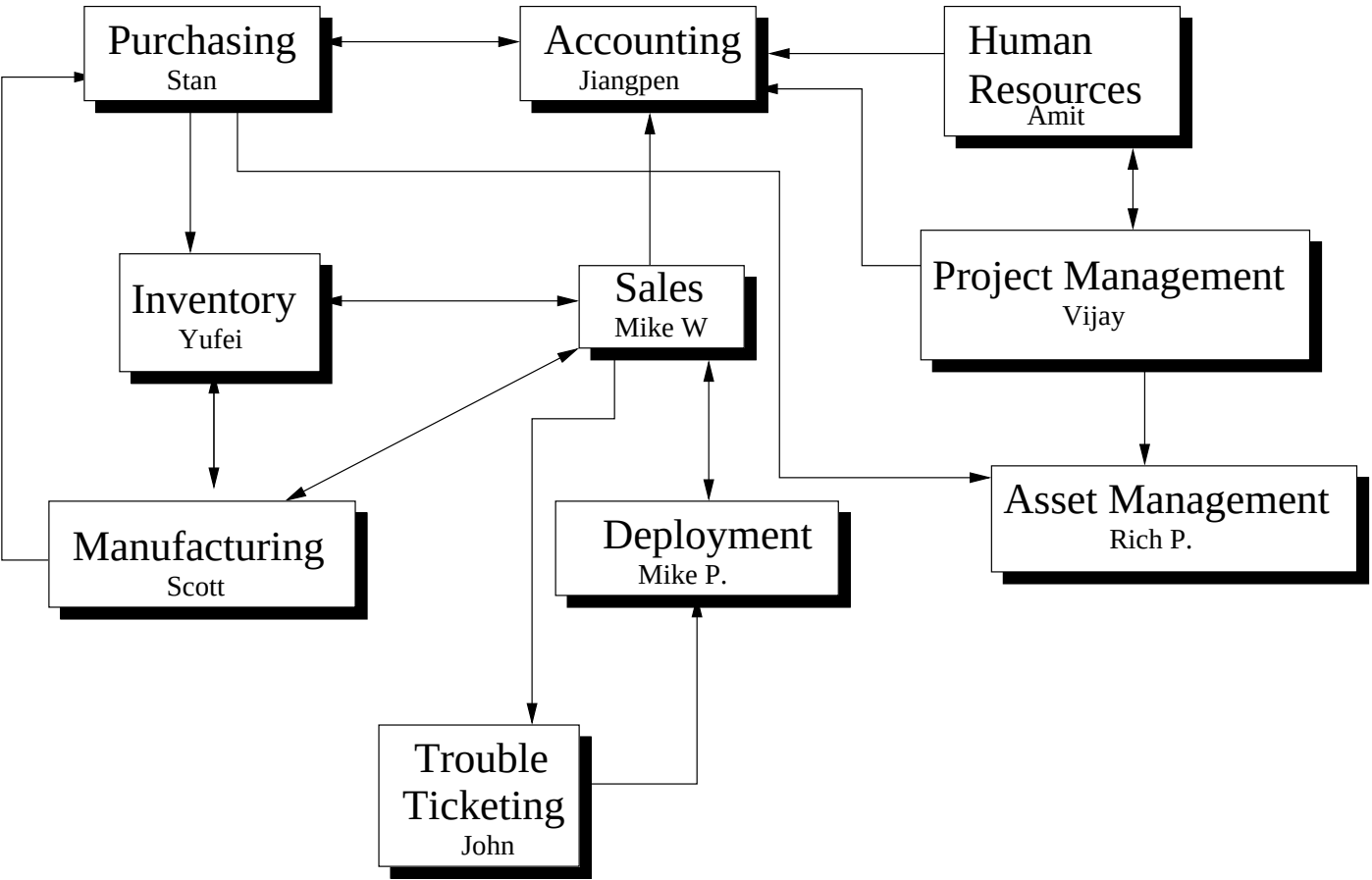
# Services Overview Diagram



Stan Rajan
CS 553 – Internet Services

# PURCHASING

## Types

### *PurchaseOrder*

Purchasing requires keeping track of every purchase order either pending or complete.

| Field | XML-RPC Type |
|---|---|
| PurchaseOrderNum | - int |
| VendorID | - int |
| VendorPartNum | - string |
| BuyerID | - int |
| ShippingCode | - int |
| OrderStatusCode | - int |
| OrderDate | - dateTime |
| PricePerUnit | - double |
| QuantityOrdered | - int |

### *OrderStatus*

Each order must be tracked and in a known state (completed, shipped, etc.).

| Field | XML-RPC Type |
|---|---|
| OrderStatusCode | - int |
| StatusDescription | - string |

### *ShippingMethod*

The shipment method of each purchase must be tracked to anticipate arrivals.

| Field | XML-RPC Type |
|---|---|
| ShippingCode | - int |
| MethodDescription | - string |
| ArrivalLocation | - string |

***Buyer***

Each purchase order must be linked with a buyer for billing and delivery purposes.

| **Field** | **XML-RPC Type** |
|---|---|
| BuyerID | - int |
| DepartmentID | - int |
| ContactName | - string |
| ContactPhone | - string |

***Vendor***

Vendor information is necessary to track where each piece of equipment was purchased.

| **Field** | **XML-RPC Type** |
|---|---|
| VendorID | - int |
| Name | - string |
| StreetAddress | - string |
| City | - string |
| State | - string |
| ContactName | - string |
| ContactPhone | - string |

***Return***

Necessary to track the status of each return request.

| **Field** | **XML-RPC Type** |
|---|---|
| ReturnID | - int |
| PurchaseOrderNum | - int |
| ReturnDescription | - string |
| ReturnDate | - dateTime |

Types needed from other services:

***Department*** type with a unique Department ID field (int)
- Human Resources

## Methods

### *Purchase Order Processing*

CreatePurchaseOrder(VendorID, VendorPartNum, BuyerID, ShippingMethod, OrderStatus, OrderDate, PricePerUnit, QuantityOrdered)
- Create a new purchase order. Purchase order ID is automatically generated.

CancelPurchaseOrder(PurchaseOrderNum) - cancels the specified purchase

GetVendorID(PurchaseOrderNum) - returns the VendorID
SetVendorID(PurchaseOrderNum, VendorID) - sets the VendorID

GetVendorPartNumber(PurchaseOrderNum) - returns the Vendor part number
SetVendorPartNumber(PurchaseOrderNum, VendorPartNum) - sets the Vendor part number

GetBuyerID(PurchaseOrderNum) - returns the BuyerID
SetBuyerID(PurchaseOrderNum, BuyerID) - sets the BuyerID

GetShippingMethod(PurchaseOrderNum) - returns the shipping method code
SetShippingMethod(PurchaseOrderNum, ShippingMethod) - sets the shipping method code

GetOrderStatus(PurchaseOrderNum) - returns the order status
SetOrderStatus(PurchaseOrderNum, OrderStatus) - sets the order status

GetOrderDate(PurchaseOrderNum) - returns the purchase date
SetOrderDate(PurchaseOrderNum, OrderDate) - sets the purchase date

GetPrice(PurchaseOrderNum) - returns the purchase price per unit
SetPrice(PurchaseOrderNum, PricePerUnit) - sets the purchase price per unit

GetQuantityOrdered(PurchaseOrderNum) - returns the quantity ordered
SetQuantityOrdered(PurchaseOrderNum, QuantityOrdered) - sets the quantity ordered

DisplayPurchaseOrder(PurchaseOrderNum) - displays the specified purchase order info
DisplayAllPurchaseOrders( ) - displays all purchase orders

### *Vendors*

AddVendor(Name, Street, City, State, Contact, ContactPhone) - adds a new vendor
RemoveVendor(VendorID) - removes the specified vendor

GetVendorName(VendorID) - returns the vendor name
SetVendorName(VendorID, Name) - sets the vendor name

GetVendorStreet(VendorID) - returns the vendors street address
SetVendorStreet(VendorID, StreetAddress) - sets the vendors street address

GetVendorCity(VendorID) - returns the vendors city

SetVendorCity(VendorID, City) - sets the vendors city

GetVendorState(VendorID) - returns the vendors state
SetVendorState(VendorID, State) - sets the vendors state

GetVendorContact(VendorID) - returns the vendors contant name
SetVendorContact(VendorID, ContactName) - sets the vendors contact name

GetVendorContactPhone(VendorID) - returns the vendors contant phone number
SetVendorContactPhone(VendorID, ContactPhone) - sets the vendors contact phone #

DisplayVendor(VendorID) - displays the specified vendors info
DisplayAllVendors( ) - displays info for all vendors

### *Returns*

ProcessReturn(PurchaseOrderNum, ReturnDescription, ReturnDate) - process a return on the given PO, ReturnID is automatically generated

GetReturnID(PurchaseOrderNum) - returns the ReturnID if it is not null

GetReturnDescription(ReturnID) - returns the reason for the return
SetReturnDescription(ReturnID, ReturnDescription) - sets the reason for the return

GetReturnDate(ReturnID) - returns the return date
SetReturnDate(ReturnID, ReturnDate) - sets the return date

DisplayReturn(ReturnID) - displays the specified return info
DisplayAllReturns( ) - displays all return info

### *OrderStatus*

AddOrderStatus(StatusDescription) - adds a new order status, code automatically generated
RemoveOrderStatus(OrderStatusCode) - removes the specified order status

GetOrderStatusDescription(OrderStatusCode) - returns the status description
SetOrderStatusDescription(OrderStatusCode, StatusDescription) - sets the status description

DisplayOrderStatus(OrderStatusCode) - displays specified order status info
DisplayAllOrderStatus( ) - displays all order status info

### *ShippingMethods*

AddShippingMethod(StatusDescription, ArrivalLocation) - adds a new shipping method
RemoveShippingMethod(ShippingCode) - removes the specified shipping method

GetShippingMethodDescription(ShippingCode) - returns shipping description

SetShippingMethodDescription(ShippingCode, StatusDescription) - returns shipping description

GetShippingArrival(ShippingCode) - returns the arrival location
SetShippingArrival(ShippingCode, ArrivalLocation) - sets the arrival location

DisplayShippingMethod(ShippingCode) - displays specified shipping info
DisplayAllShippingMethods( ) - displays all shipping method info

***Buyers***

AddBuyer(Department, ContactName, ContactPhone) - adds a new buyer
RemoveBuyer(BuyerID) - removes the specified buyer

GetBuyerDepartment(BuyerID) - returns the buyers department
SetBuyerDepartment(BuyerID, Department) - sets the buyers department

GetBuyerContactName(BuyerID) - returns the contact name for the buyer
SetBuyerContactName(BuyerID, ContactName) - sets the contact name for the buyer

GetBuyerContactNumber(BuyerID) - returns the contact phone number for the buyer
SetBuyerContactNumber(BuyerID, ContactPhone) - sets the contact phone number for the buyer

DisplayBuyer(BuyerID) - displays specified buyer info
DisplayAllBuyers( ) - displays info for all buyers

**Justification of Types and Methods**

The purchasing types and methods used in this web service are based on the business model found in the SAP tutorial in addition to commercial purchase order software packages. The *Buyer* and *Purchase* types and methods are based on those used in the *Purchase Order* software package by Cougar Mountain Software. *Vendor* and *Shipping* methods were also based on this package in addition to KDI Information Systems Support *Purchase Orders* documentation.

**Simulated Load**

The initial load of the purchasing service will be loaded from a flat file. This initial load will be predominantly populated with completed purchase orders but will also include new and in progress orders. A client program will simulate the daily interactions of the purchasing service. The client program will use a flat file containing a list of method calls and queries as input to simulate the various day to day interactions with the service.

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CS533 – Internet Services
Proposal for eb Service # – Accounts Payable Accounts Receivable

## Objects:

***pense***

*pense* represents e penses occurred during all purchases.

Assumptions:

- Amount is always paid in full (no partial payment)
- The vender specified by *Vender d* is the payee
- *Vender* object is stored by the **Pu chasin** S
- Ignore late fee, etc.

| **Field** | **Type** |
|---|---|
| E penseId | int |
| PONumber | int |
| Amount | double |
| VenderId | int |
| EmployeeId | int |
| ScheduledDate | date |
| PaidDate | date |
| IsPaid | Boolean |
| CheckId | int |

***n oice***

*n oice* represents invoices that are going to be sent to customers.

Assumptions:

- All payers are considered as customers
- Amount is always paid in full (no partial payment)
- The customer specified by *us o er d* is the payer
- *us o er* object is stored by the **Sales** S
- Ignore late fee, etc.

| **Field** | **Type** |
|---|---|
| InvoiceId | int |
| InvoiceNumber | int |
| Amount | double |
| DueDate | date |
| PaidDate | date |
| CustomerId | int |
| CustomerPONum | int |
| IsPaid | boolean |
| Reminders | date |
| CheckId | int |

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***hec***

*hec* represents checks that carry money.

Assumptions: Only consider the basic information of a check

| **Field** | **Type** |
|---|---|
| CheckId | int |
| CheckNumber | int |
| Amount | double |
| CheckDate | date |
| IsCustomerCheck | boolean |

## Methods:

***ccounts Paya e***

ScheduleE pense
- → PONumber int
- → ScheduledDate date
- → Amount double
- → VerderId int
- → EmployeeId int
- ← (E penseId) int

PayE pense
- → E penseId int
- ← CheckNumber

IsE pensePaid
- → E penseId int
- ← (IsPaid) boolean

GetE pensePONumber
- → E penseId int
- ← (PONum) int

GetE penseAmount
- → E penseId int
- ← (Amount) double

GetE penseVenderId
- → E penseId int
- ← (VenderId) int

GetE penseScheduledDate
- → E penseId int
- ← (ScheduledDate) date

GetE pensePaidDate
- → E penseId int
- ← (PaidDate) date

GetE penseCheck
- → E penseId int

← (Check) Check

SetE pensePONumber
→ E penseId int
→ PONum int
← void

SetE penseAmount
→ E penseId int
→ Amount double
← void

SetE penseVenderId
→ E penseId int
→ VenderId int
← void

SetE penseScheduledDate
→ E penseId int
→ ScheduledDate date
← void

SetE pensePaidDate
→ E penseId int
→ PaidDate date
← Void

ReportAllE penses
→ void
← (E penseId s) int

ReportE pensesOfPO
→ PONum int
← (E penseId s) int

ReportE pensesOfVender
→ VenderId int
← (E penseId s) int

ReportE pensesOfEmployee
→ EmployeeId int
← (E penseId s) int

ReportAllPaidE penses
→ void
← (E penseId s) int

ReportAllUnpaidE penses
→ void
← (E penseId s) int

DumpE penses
→ E penseIds int
← (E penses) E pense

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## ***ccounts Recei a e***

Some Getters Setters are omitted

IssueInvoice

| | | |
|---|---|---|
| → | CustomerId | int |
| → | CustomerPONum | int |
| → | DueDate | date |
| → | Amount | double |
| ← | (InvoiceId) | int |

ReceivePayment assuming always pay in full

| | | |
|---|---|---|
| → | InvoiceId | int |
| → | CustomerCheckNumber | int |
| → | CustomerCheckDate | date |
| ← | void | |

RemindCustomer

| | | |
|---|---|---|
| → | InvoiceId | int |
| ← | void | |

IsInvoiceOverDue

| | | |
|---|---|---|
| → | InvoiceId | int |
| ← | (IsOverDue) | Boolean |

IsInvoicePaid

| | | |
|---|---|---|
| → | InvoiceId | int |
| ← | (IsPaid) | boolean |

ReportAllInvoices

| | | |
|---|---|---|
| → | void | |
| ← | (InvoiceId s) | int |

ReportInvoiceOfCustomerPO

| | | |
|---|---|---|
| → | CustomerPONum | int |
| ← | (InvoiceId s) | int |

ReportE pensesOfCustomer

| | | |
|---|---|---|
| → | CustomerId | int |
| ← | (InvoiceId s) | int |

ReportAllPaidinvoices

| | | |
|---|---|---|
| → | void | |
| ← | (InvoiceId s) | int |

ReportAllUnpaidInvoices

| | | |
|---|---|---|
| → | void | |
| ← | (InvoiceId s) | int |

DumpInvoices

| | | |
|---|---|---|
| → | InvoiceIds | int |
| ← | (Invoicess) | Invoice |

## ***hec ontro ing***

GetCheckInformation

| | | |
|---|---|---|
| → | CheckNumber | int |
| ← | (Check) | Check |

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Process eb Service – Human Resource Management

The basic types I will model are:

**mployee**

This the main type which forms the basis of HR Management

| **Field** | **XML RPC Type** |
|---|---|
| Employee ID | String |
| irstName | String |
| MiddleName | String |
| LastName | String |
| DOB | dateTime |
| Se | String |
| obID | int |
| DepartmentID | int |
| Status ield | boolean |

**epa tment**

Tracks the Departments in the company

| **Field** | **XML RPC Type** |
|---|---|
| DepartmentID | int |
| DepartmentName | String |
| EmployeeList | int |

**Jo esc iption**

Keeps a list of All the ob Descriptions in the company.:PositionID is an instance of a particular ob

| **Field** | **XML RPC Type** |
|---|---|
| obID | int |
| DepartmentID | int |
| PositionID | int |

**Position esc iption**
Describes the specific position job

| Field | XML RPC Type |
|---|---|
| PositionID | int |
| PositionTitle | String |
| SalaryGrade | int |
| Status ield | boolean |

**Sala y**
Keeps track of Salary Information for Each employee

| Field | XML RPC Type |
|---|---|
| EmployeeID | int |
| SalaryGrade | int |
| SalaryAmount | int |
| BonusPlan( earlyAmt) | int |

**Hi in P omotions**
Keeps Hiring and Promotion Information for Each Employee

| Field | XML RPC Type |
|---|---|
| EmployeeID | int |
| HireDate | dateTime |
| PromotionDates | dateTime |
| ReleaseDate | dateTime |

**enefits**
Keeps tracks of Benefits for Each Employee

| Field | XML RPC Type |
|---|---|
| EmployeeID | int |
| SavingsPlan | String |
| MedicalPlan | String |
| DentalPlan | String |

METHODS

AddEmployee(EmployeeID, irstName,MiddleName,LastName,DOB,Se , obID, SalaryAmount,BonusPlan,HireDate,SavingsPlan,MedicalPlan,DentalPlan)-used to add employees to the system
DelEmployee(EmployeeID,ReleaseDate)-removes employee from the system:sets Status ield to false
ListEmployees()-gives the list of employees

AddDepartment(DepartmentID,DepartmentName)-Add a department to the system
RemoveDepartment(DepartmentID)-removes a department
ListDepartments()-list all the departments
ListEmpDepartment(DepartmentID)-list employees working in a particular department

Add ob( obID,PositionID,PositionTitle,Status,DepartmentID,SalaryGrade)-add a job to the system
Remove ob( obID)-remove a job from the system
List obs()-list the current active jobs
Open obs()-Lists open positions

ChangeSalary(EmployeeID,SalaryAmount,Bonus)-change the salary of a particular employee
ListSalaries()-generate a list of all employees with their salaries

AddPromotions(EmployeeID,PromoDate,NewSalary)-Assign a promotion
ListPromotions(EmployeeID)-List the Promotion dates for a particular emplpyee
ListHireDate(EmployeeID)-List the Hire Date for a particular employee

ChangeBenefits(EmployeeID,Savings,Medical,Dental)-change the benefit plan
ListBenefits(EmployeeID)-list benefits for a particular employee

**SIMULATI N**

or populating jobs and employees to the system I will first generate a list of jobs and assign these jobs to a list of Employees.
I plan to use flat files to store my data structures
After there are sufficient employees in the system, the program will randomly call one of the methods to
i)change employee information: change job description,change salary information,change benefits information
ii)change job information:either to add new jobs, remove jobs from the system

In order to keep payroll salary information for each employee I will need to interact with the Payroll webservice, to keep Department information I would need to track changes such as creation deletion of departments in the company

# CS 553 Spring 2004

Web service descriptions

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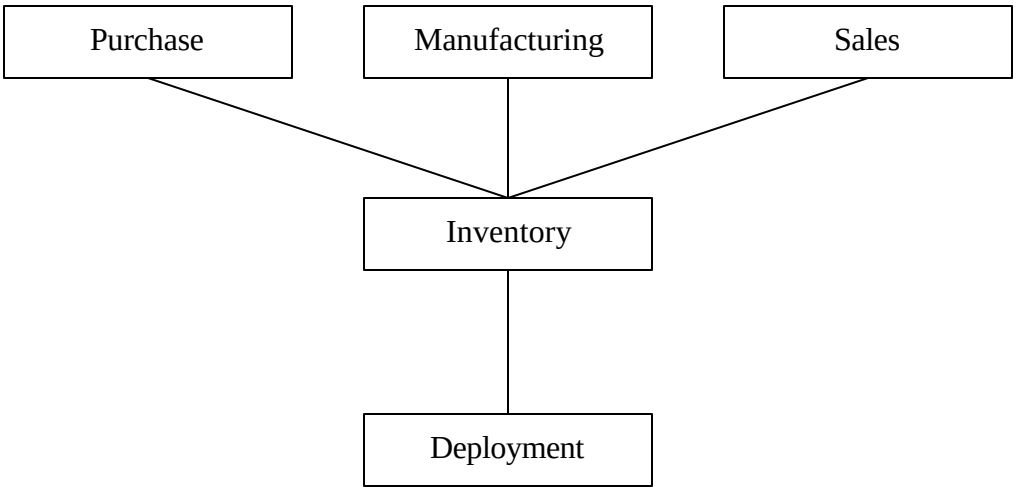
# CS553: Inventory service design

Yufei Pan

## Interaction with other services:




## Data Types:

**ProductType**

| Field | XML-RPC Type |
|---|---|
| PartNum | string |
| Name | string |
| Description | string |

**Field specification:**

- PartNum: a unique identification number standing for the product type
- Name: a string giving the human-readable name for the type
- Description: a string describing the product-specific properties

**ProductItem**

| Field | XML-RPC Type |
|---|---|
| SerialNum | int |
| BarCode | string |

| | |
|---|---|
| PartNum | string |
| LotID | int |
| LocationID | int |

**Field specification:**

- SerialNum: a unique serial number for a product item.
- BarCode: a unique bar code for a product item
- PartNum: the ID of the type of the product item
- LocationID: the id of the location where item is stored currently. -1 means that item is on the way.

**ItemHistoryEntry**

| Field | XML-RPC Type |
|---|---|
| SerialNum | int |
| Action | string |
| LocationID | int |
| Time | dateTime |

**Field specification:**

- SerialNum: the serial number of item.
- Action: the defined action is "REMOVE" and "ADD".
- LocationID: the id of location involved.
- Time: the time when action is taken

**Lot**

| Field | XML-RPC Type |
|---|---|
| LotID | int |
| ItemArray | array of string |

**Field specification:**

- LotID: the id of lot, which is a group of items.
- ItemArray: the serial numbers of items in the lot

**Location**

| Field | XML-RPC |
|---|---|
| LocationID | int |
| Site | int |
| Building | string |
| Floor | string |
| Room | string |

**Field specification**

I just keep the same definition of location used in Asset Service.

## Methods:

**BarCoding**

| | |
|---|---|
| Boolean | assignBarCode(string SerialNum, string barCode) |
| string | queryBarCode(string SerialNum) |
| int | queryItemSN(string barcode) |

**Warehouse Management**

| | |
|---|---|
| Boolean | removeItem(string SerialNum,<br>dataTime time) |
| Boolean | storeItem(string SerialNum,<br>int locationID,<br>dateTime time) |
| Boolean | transferToDeployment(string SerialNum,<br>dataTime time) |
| int | queryLocation(string SerialNum) |
| ItemHistory[] | queryItemHistory(string SerialNum) |

**Lots tracking**

| | |
|---|---|
| int | queryLot(string SerialNum) |
| Boolean | assignLot(string SerialNum, Lot lot) |
| int[] | getItemsInLot(Lot lot) |

**Type tracking**

| | |
|---|---|
| string | queryProductType(string SerialNum) |

**Quantity tracking**

| | |
|---|---|
| int | queryQuantity(string PartNum) |

**Indirection query**

| | |
|---|---|
| ProductType | getProductType(string PartNum) |
| ProductItem | getProductItem(string SerialNum) |
| Lot | getLot(int lotID) |
| Location | getLocation(int locationID) |

**Junk Query**

| | |
|---|---|
| int[] | getAllItems() |
| int[] | getAllTypes() |
| int[] | getAllLots() |
| int[] | getLocations() |

## Simulated load generation:

I will generate about 100 locations, 100 production types, 1,000 - 10,000 items for each type. Also, I will execute about 2 random movements (from one location to another location) for each item.

Michael ood
CS 553 eb Service Proposal

My project is to develop a Sales Management package for ubar, Inc. Here are the data types and methods I propose.

## ATA T P S

### P oduct

The system needs to know about ubar s products so that sales reps can enter orders without having to fill in all the details. The product information maintained here will likely be different from that maintained by the Inventory and Manufacturing services.

| | |
|---|---|
| PartNumber | string |
| ProductLineID | int |
| Description | string -- the product name |
| BasePrice | double |
| DiscountCodes | array of strings |
| DiscountRates | array of doubles |
| SubstitutePartNumber | string -- what to substitute if this item is out of stock |
| IsActive | boolean -- set false for discontinued items |

### Custome

e must store the customer s address for shipping and returns purposes. The status value tells us if a contract job is ongoing, if the customer is no longer valid, etc.

| | |
|---|---|
| CustomerID | int |
| CustomerName | string |
| CustomerPhone | string |
| BillingStreetAddress | string |
| BillingTown | string |
| BillingState | string |
| Billing ip | string |
| ShippingStreetAddress | string |
| ShippingTown | string |
| ShippingState | string |
| Shipping ip | int |
| AccountBalance | double -- sales or accounts receivable |
| Status | string |

### Sale

The *Sa e* object comprises the information a sales rep needs in order to fill out an invoice and complete a sale.

| | |
|---|---|
| ReferenceNo | int |
| CustomerID | int |
| SalespersonID | string |
| DateAndTime | dateTime.iso |
| LineItems | array of SalesLineItem objects |
| SalesTa | double |

| | | |
|---|---|---|
| ShippingCharge | double | |
| DeliveryTa | double | -- related to the customer s location |
| Total | double | |
| AmountPaid | double | |
| Status | Boolean | -- shipped yet ( N) |
| TrackingNo | int | |

**SalesLineItem**

*Bi ing a e* applies to contract jobs, in which case *uan i y* will be the hours billed.

| | |
|---|---|
| PartNumber | string |
| SerialNumbers | array of string |
| BillingRate | double |
| HoursBilled | double |
| DiscountCode | string |
| SoftwareKey | string |

**Retu n**

Keeps a record of all merchandise returns ubar s decision to accept or reject the return (based on condition, etc.) and the amount credited to the customer s account.

| | | |
|---|---|---|
| ReferenceNo | int | -- local key |
| SalesReferenceNo | int | -- foreign key into the Sales database |
| PartNumber | string | |
| QuantityReturned | array of SerialNums | |
| DateReturned | dateTime.iso | |
| IsAccepted | array of Boolean | |
| AmountCredited | array of double | |
| Comments | string | |
| ReplacementReferenceNo | string | |

**M TH S**

**Sales o de p ocessin**

CreateOrder (customerID, salesperson) – sets up a new order invoice for the sales rep.
AddItemToOrder (SalesLineItem) – adds a line item to an invoice. ills in product description, software key (if applicable)
Remove romOrder (productID, quantity) – deletes a line item from an invoice
PostOrder () – Creates and returns a ReferenceNo for this order. Posts the order invoice so that the warehouse can fulfill it and it can be shipped.
DisplayOrder (ReferenceNo) – Displays a simple list of the sales line items, ta , total, and customer name ID
CreateLineItem(productID, quantity) initiali es a new SalesLineItem object
Get SetItemQuantity(SalesLineItem)
Get SetSoftwareKey(SalesLilneItem)
SetDiscountCode(SalesLineItem)
CalculateTa (Sale object), CalculateTotal(Sale object)
DisplayBalance (CustomerID) – returns the balance on an account
CreateProduct (description, price, discount rate) – adds a new product to the database creates and returns a product ID

Get Set product attribute (productID, attributeValue) – for those attributes that should be readable writable by a salesperson
DiscontinueProduct (productID)
DisplayProduct (productID) – Displays the product information maintained in the sales database
ProductName ID(productID), ProductID Name(description)
CreateCustomer (Name, Shipping,Billing Address, Town, State, ip ) – adds a new customer to the database
Get Set customer attribute (CustomerID, attributeValue) – for those attributes that should be readable writable by a salesperson
DeactivateCustomer (CustomerID) – marks a customer as no longer valid active
DisplayCustomerHistory (CustomerID, Date) – shows the purchases on record for this customer since *da e*
DisplayCustomer(CustomerID) – Displays the customer information maintained in the sales database
CustomerName ID(), CustomerID Name()
ApplyCharge(CustomerID, Amount) – returns the account balance after the charge
ApplyCredit(CustomerID, Amount) – returns the account balance after the credit

**uotations**

GetPriceOrRate (ProductID, discountCode, bool includeTa ) – returns the full or discounted price of an item, or the rate for contract work

**In oicin**

Invoices and orders display different collections of sale information in different ways
DisplayInvoice (ReferenceNo) – displays the full invoice pertaining to a specific order

**Shippin**

GrabItem (productID, quantity) – obtains the item needed for shipping and decrements the inventory obtains substitute items if necessary.
SetShippingCost (ReferenceNo) – establishes the cost of shipping the order
GetShippingCost (ReferenceNo) – returns the shipping cost for the order
PostShipment (ReferenceNo) – informs the sales database that a shipment has been performed by recording and returning a tracking number

**Retu ns**

AddReturn (SalesReferenceNo, Comments) – adds a return record to the database
AcceptReturn (bool IsAccepted, double AmountCredited) – marks return as accepted rejected, credits the customer s account
RunningTotalReturns(Date) – returns the total value of all returns accepted since *da e*

**SIMULAT L A**

A temporary database of customers and products will be set up by a client program that calls the Create() methods several times over. Then the actual testing will occur as the client simulates the real-world activity of taking and fulfilling orders, making shipments, and accepting returns and synchroni ing these transactions with the Inventory Service. The client will invoke some logical sequence of these operations, and before terminating it will call DisplayCustomerHistory() on each customer RunningTotalSales() and RunningTotalReturns() for purposes of auditing and verification. I will also obtain statistics from Inventory Management to ensure Sales and Inventory are properly synchroni ed.

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# CS 553 – Internet Services
# Dr. Richard Martin

## Project – Stage I Description
## Topic: Project Management

Based on my understanding of the topic and the ways to interpret it, I chose to break it down into 2 broad components –

1) Project Management is often used to track the progress of and manage the resources (i.e. people, equipment, subcontractors, etc.) used in complex projects.
2) From a customer's perspective, it involves preparing bills (including pricing) and tracking orders.

This web service may interact with Asset management (which may place asset requests), Purchasing (where the asset requests will be checked and redirected), and HR(place staffing requests)

These are the various types I feel the need for, as I make an initial design of the system:

**Asset Requirements**
This type would get information from Asset Management when the need is felt for asset purchases and the information would be passed on to the Purchases Department

| | |
|---|---|
| asset_req_id | int |
| asset_type | string |
| quantity | int |
| requirements_text | string |
| date_required_by | datetime |

**Department**
Various departments in the company that can place requests for staff

| | |
|---|---|
| department_id | string |
| department_name | string |
| requirement_text | string |
| requirement_num | int |

**Staffing Requirements**
This type would get information regarding staffing requirements from any department and the matter would be referred to HR.

| | |
|---|---|
| staff_req_id | int |
| department_id | string |
| requirements_text | string |
| number_required | int |
| date_required_by | datetime |

**Bill**
Get order information and generate a bill for customer.

CustomerID string
Purchase Order Number int

All classes/tables created by Stan Rajan for Purchasing will be crucial to my implementation. Maybe, the '**return_products**' implementation is better suited in my project – since Project Management deals with customer interaction and status checking.

//in Customer table/entity, "Boolean payment_received" to be included for the purposes of my project.

**Methods:**

submit_asset_req(type, number, date, notes)
submit_staffing_req(dept, number, date, notes)
send_asset_req(asset_req_id)
remove_staffing_req(asset_req_id)
remove_staffing_req(staff_req_id)
send_staffing_req(staff_req_id)
create_bill(cust_id, order_id)
update_status(order_id, status_text, shipping_date, delivery_date)
create_return(order_id, return_reason, date)
track_return(return_id)
credit_payment(return_id)

**Simulated Load**

A program would create a simulated system with a bunch of customers, orders, and departments. Then, the asset management department will place various asset requests, various other departments will place many staffing requests, the status of various orders would be updated, bills generated, customer tracking requests placed, and the ability of the web service to handle such multiple simultaneous requests correctly will be tested.

**Scott Battaglia**
**CS553 – Internet Services**
**Professor Richard Martin**
**February 18, 2004**

**TYPES:**

***Bill of Material***

This type would represent the product and the parts that make up the product in the manufacturing process.

| **Field** | **XML-RPC Type** |
|---|---|
| Id | int |
| Product_Name | String |
| PartNum | String |
| Parts | Array of ints |

***Engineering Change Notice***

This would represent an Engineering Change Notice request.

| **Field** | **XML-RPC Type** |
|---|---|
| Id | int |
| Product_Name | String |
| PartNum | String |
| partChanges | array of structs of ids |

***GenericPart***

This represents the common part needed (i.e. screw but not say a screw by Home Depot).

| **Field** | **XML-RPC Type** |
|---|---|
| Id | int |
| Amount | int |
| Name | String |

***Vendor***

This represents the manufacturer of the specific part.

| **Field** | **XML-RPC Type** |
|---|---|
| Name | String |
| vendorID | int |
| Address | String |
| State | String |
| Zip Code | String |

| | |
|---|---|
| City | String |
| Contact Name | String |
| Contact Number | String |

***Product***

This represents the product type (i.e. Temperature Sensor).

| **Field** | **XML-RPC Type** |
|---|---|
| Id | int |
| Name | String |

***ProductInstance***

This represents a specific product instance, i.e. a specific Temperate Sensor

| **Field** | **XML-RPC Type** |
|---|---|
| Parts | array of vendorPartNum |
| SerialNumber | String |
| ManufacturedDate | dateTime.iso8601 |
| Product_Name | String |
| Part_Number | String |

***SpecificPart***

This represents a specific part type made by a manufacturer.

| **Field** | **XML-RPC Type** |
|---|---|
| Id | int |
| Vendor_ID | int |
| VendorPartNum | String |
| Cost | double |
| Name | String |
| Amount | int |

```
public interface InventoryManager
{
	public Collection getOutOfStockParts();
	public Collection getLowStockParts();
	public Collection getPartsWithStockLessThan(int amount);
	public Collection getPartsWithStockGreaterThan(int amount);
	public Collection getSpecificParts(int id);
	public int incrementPartAmount(String partId, int amount)
		throws MaximumAmountException;
	public int decrementPartAmount(String partId, int amount)
		throws MinimumAmountException;
	public GenericPart addPartType(int part_id);
	public GenericPart addSpecificPart(String partId, int mid, double cost, String name, int count);
	public SpecificPart updateSpecificPartCost(String partId, double cost);
	public boolean removeSpecificPart(String partId);
	public boolean removeGenericPart(int id);
	public Collection getManufacturers();
	public Manufacturer ManufacturerById(int id);
	public Collection getPartsByManufacturer(int mid);
	public double getAveragePartPrice(int pid);
	public double[] getPartPriceHistory(String partId);
	public double getAverageProductCost(int bom);
}
```

***NOTE: The InventoryManager will be required to interface with the Purchasing Service***

```
public interface ManufacturingManager
{
	public ProductInstance buildSensor(String productID)
		throws NotEnoughMaterialsException;
	public Collection buildSensors(String productID, int amount)
		throws NotEnoughMaterialsException;
	public Collection buildSesnsorsToStock(int id);
	public ProductInstance increaseStage(String serialNumber)
		throws FinishedProductException;
	public Collection increaseStage(Collection collection);
	public boolean updateBillOfMaterialsBasedOnECN(int nid);
}
```

***NOTE: The ManufacturingManager will most likely need to talk with the Sales to determine how much product to make.***

```
public interface MaterialRequirementsPlanningManager
{
	public Collection getListOfRecommendedPartsToReOrder();
	public void addProductToMasterProductionSchedule(Product product, int quantity, Date estimatedStartDate);
```

```
    public void removeProductFromMasterProductionSchedule(Product product, Date estimatedStartDate);
}
```

Note: There will also be other methods to do things such as addBillOfMaterial, etc. that will essentially be the data entry into the database.

***Simulated Load***

Data will be entered in to the database. This will either be done using a script to enter directly into the database, or via the methods provided. A program will then be created that will simulate building up an inventory of parts and then continually building sensors and updating parts via simulation of both build-to-stock and build-to-order. This should simulate the day-to-day build-up and use of parts as well as the creation of new products. At the end the reporting methods can be used to see what was created and used.

Michael Pagliorola
Internet Services

A deployment web service, as researched, is best be described as unifying system of post inventory management and support services. The methods described below should be adiquite to allow for the support service to get information on individual, and the over all, states of the deployed products. As such this service should be fed by the sales and trouble ticket webservices in order to keep the information up to date.

## Objects:

### *Product*

| **Field** | **XML-RPC Type** |
|---|---|
| Product Name | - String |
| Part Number | - String |
| Serial Number | - String |
| Customer ID | - Int |
| Software Version | - String |
| Operational Status | - boolean |
| Recall Notice | - boolean |
| Manufacture Date | - dateTime |
| End of Mantenence | - dateTime |
| End of Life | - dateTime |

### *Customer*

| **Field** | **XML-RPC Type** |
|---|---|
| Customer ID | - Int |
| Customer Name | - String |
| Street Address | - String |
| City | - String |
| State | - String |
| Postal Code | - String |
| Country | - String |
| Contact Name | - String |
| Contact Email | - String |
| Contact Phone Number | - String |

### *Software*

| **Field** | **XML-RPC Type** |
|---|---|
| Product Name | - String |
| Customer ID | - Int |
| Software Version | - String |
| Update Available | - Boolean |
| Recall Notice | - Boolean |
| End of Mantenence | - dateTime |
| End of Life | - dateTime |

**Methods:**

***Product***

addProduct(Product, Customer, dateTime)
removeProduct(serialNumber)
updateProductStatus(serialNumber, operationalStatus)
getProductStatus(serialNumber)

***Software***

addSoftware(Software, Customer, dateTime)
removeSoftware(productName, customerID)
updateSoftwareAvailable(productName)
getSoftwareAvailable(productName)
    * Calls support services to check if an update is available
updateSoftwareVersion(productName, softwareVersion);

***Shared***

getRecall(productName);
    * Calls support services to check for a recall
updateRecall(String productName, Boolean status)
    - Announce/cancel recall of specified product
getEndOfMantenence(productName, customerID);
updateMantence(productName, CustomerID)
getEndOfLife(String productName);
    * Calls support service to check for EndofLife
updateEndOfLife(productName, dateTime)

***Informative Queries***

getTotalDeployed(productName, dateTime, dateTime)
    - Returns the total amount of product deployed between a given date
getTotalCustomers(customerID, productName);
    - Returns the total amount of customers with the specified product
getTotalFailedProducts(productName);
getFailedProducts(productName, dateTime, dateTime)
    - Returns product(s) that failed during the time period
getCustomersByProducts(productName);
    - Returns all products a customer has
getProductsByCustomer(customerID);
    - Returns all customers that have a product

**Simulated Load:**

A basic main program will randomly create sales and service events then update the system appropriately while also dumping it's output to a log file for verification upon completion. After a given amount of time the main program will then ask for statics from the serivice which can be checked against the output file to ensure proper execution.

Richard Psota
CS 553 – Internet Services
Professor Martin

For my job, one of my projects is the deployment of an **enterprise asset management** system for my division. Based on my familiarity with the system and the data stored in the system, I put together the following types and methods.

## TYPES:

***Employee***

The asset tracking module would need to track some basic information on employees since it is necessary to know who owns the equipment.

| **Field** | **XML-RPC Type** |
|---|---|
| Employee ID | - string |
| First Name | - string |
| Last Name | - string |
| Department Number | - int |

***Asset***

The asset tracking module would need to track detailed information on all of Fubar's assets. This includes information related to the purchase, installation, and disposal of the assets.

| **Field** | **XML-RPC Type** |
|---|---|
| Asset ID | - int |
| Asset Description | - string |
| Asset Classification | - string |
| Model # | - string |
| Serial # | - string |
| Owner – Employee ID | - int |
| Department Number | - int |
| Purchase Date | - dateTime |
| Purchase Price | - double |
| Installation Date | - dateTime |
| Location ID | - int |
| Vendor ID | - int |
| Disposal Date | - dateTime |
| Status | - string |

***Vendor***

The asset tracking module would need to track some basic information on vendors since it is necessary to know who sold the equipment to Fubar.

| **Field** | **XML-RPC Type** |
|---|---|
| Vendor ID | - int |
| Vendor Name | - string |
| Vendor Street Address | - string |
| Vendor Town | - string |
| Vendor State | - string |
| Vendor Country | - string |
| Vendor Contact | - string |
| Vendor Contact Phone # | - string |

***Location***

The asset tracking module would need to track the exact location of the equipment. In order to achieve this level of detail, the location type would be required.

| **Field** | **XML-RPC Type** |
|---|---|
| Location ID | - int |
| Site | - string |
| Building | - string |
| Floor | - string |
| Room | - string |

***Department***

The asset tracking module would need to track some basic information on the departments within the company.

| **Field** | **XML-RPC Type** |
|---|---|
| Department Number | - int |
| Department Name | - string |

***Depreciation***

The asset tracking module would need to track important values to be used in the depreciation calculations.

| **Field** | **XML-RPC Type** |
|---|---|
| Asset Classification | - string |
| Depreciation Percentage per year | - double |
| Expected lifetime in years | - int |

## Methods

***Detailed Tracking***
AddEmployee(FirstName,LastName,EmployeeID,DepartmentNumber) – Adds a new employee to the employee table.
RemoveEmployee(EmployeeID) – Removes an employee from the employee table.
GetAllEmployees() – Returns an iterator to access all employees.
GetAllAssets() – Returns an iterator to access all assets.
AddVendor(Name,StreetAddress,Town,State,Country,Contact,ContactPhone) – Adds a new vendor to the vendor table.
RemoveVendor(VendorID) – Removes the vendor from the vendor table.
GetAllVendors() – Returns an iterator to access all vendors.
AddLocation(Site,Building,Floor,Room) – Adds a new location to the location table.
RemoveLocation(LocationID) – Removes the location from the location table.
GetAllLocations() – Returns an iterator to access all locations.
AddDepartment(DepartmentNumber,DepartmentName) – Adds a new department to the department table.
RemoveDepartment(DepartmentNumber) – Removes a department from the department table.
GetAllDepartments() – Returns an iterator to access all departments.
AddDepreciationValue(Class,Percentage,Lifetime) – Adds a new depreciation value to the table.
RemoveDepreciationValue(Class,Percentage,Lifetime) – Removes the depreciation value from the table.
GetAllDepreciationValues() – Returns an iterator to access all depreciation values.
CreateAsset(Description,Classification,EmployeeID,PurchasePrice,PurchaseDate,Department,LocationID, VendorID) – Create a new asset record with the required fields provided.
GetAssetDescription(AssetID) – returns a description of the asset with the given asset ID
SetAssetDescription(AssetID,Description) – sets the description of the asset
GetAssetClassification(AssetID) – returns the classification of the asset with the given asset ID
SetAssetClassification(AssetID,Classification) – sets the classification of the asset
GetModelNumber(AssetID) – returns the model number of the asset with the given asset ID
SetModelNumber(AssetID,ModelNumber) – sets the model number of the asset
GetSerialNumber(AssetID) – returns the serial number of the asset with the given asset ID
SetSerialNumber(AssetID,SerialNumber) – sets the serial number of the asset
GetPurchaseDate(AssetID) – returns the purchase date of the asset
SetPurchaseDate(AssetID,PurchaseDate) – sets the purchase date of the asset
GetPurchasePrice(AssetID) – returns the purchase price of the asset
SetPurchasePrice(AssetID,PurchasePrice) – sets the purchase price of the asset
GetInstallationDate(AssetID) – returns the installation date of the asset
SetInstallationDate(AssetID,InstallationDate) – sets the installation date of the asset
GetLocationID(Site,Building,Floor,Room) – returns the location id for the entered location
GetLocation(AssetID) – returns the Site + “-“ + Building + “-“ + Floor + “-“ + Room of the given asset ID
SetLocation(AssetID,LocationID) – sets the location id of the asset
GetVendorId(VendorName) – returns the vendor id for the given vendor name
GetVendor(AssetID) – returns the Vendor Name for the given asset
SetVendor(AssetID,VendorID) – sets the vendor id for the given asset

***Depreciation and Gain/Loss Detail***
CalculateDepreciation(AssetID) – returns the depreciated value for the given asset using the depreciation percentages in the Depreciation table.
RunningTotal() – returns the total value of assets that have not been disposed

***Ownership***
GetEmployeeID(FirstName,LastName) – returns the employee identifier for the given employee
GetOwnerName(AssetID) – returns the first and last name of the employee that owns the asset
SetOwnerName(AssetID,EmployeeID) – sets the employee id for the owner of the asset
GetDepartment(AssetID) –returns the department that owns the asset
SetDepartment(AssetID,DepartmentNumber) – sets the department that owns the asset

***Disposal***

GetCurrentStatus(AssetID) – returns the current status of the asset
SetCurrentStatus(AssetID,Status) – sets the current status of the asset (In Service, Broken, Disposed)
GetDisposalDate(AssetID) – returns the date that the asset was disposed
DisposeOfAsset(AssetID,DisposalDate) – sets the disposal date of the asset to DisposalDate and updates the status to disposed

**Simulated Load**

There will be a main client program that initially generates new assets. This will simulate the initial population of assets into the asset management system. After there are sufficient assets in the system, the program will randomly choose different get and set methods to represent daily asset operations. This will simulate the day to day queries and updates that would take place in Fubar. During this time, new assets would be sporadically added and other items would be disposed. The function calls would allow for the correct system operation to be verified. At the end of the program, the RunningTotal() function would be run to determine the total value of Fubar's assets.

ohn rancisco
Internet Services
Rich Martin
ebruary,

# T ou le Tic etin e Se ice Re ised API

## Types

There are three data types in the Trouble Ticketing API (TT-API) the Trouble Ticket (TT), Incident Report (IR), and Bug Report (BR).

## T ou le Tic et

| Attribute: | ML Type: | Description: |
|---|---|---|
| Ticket ID | dateTime.iso | Time ticket was opened, primary key |
| Owner | string | Owner of the faulty product |
| PartNumber | string | Part # of faulty product |
| CloseDate | dateTime.iso | Time ticket is closed |
| Closer | string | Person who closes the ticket |
| Status | int | Determines status of ticket |
| Description | string | Description of problem |

**Lo ical Tic et Types**:

Pending Ticket: Newly created TT Status -
- newly created with little or no Incident Reports assigned to it

Trouble Ticket: Active TT Status
- complete and active Ticket

Closed Ticket: Inactive TT Status
- a Ticket for a problem that is no longer an issue

## Incident Repo t

| Attribute: | ML Type: | Description: |
|---|---|---|
| Ticket ID | dateTime.iso | Ticket this IR is associated with |
| Incident ID | dateTime.iso | Time this IR was generated, primary key |
| Description | string | Description of the problem |
| SerialNumber | string | Serial # version of the faulty product |
| PartNumber | string | Part # of the faulty product |
| Owner | string | Owner of faulty product |
| Live | boolean | True if product is still afield |

## u Repo t

| Attribute: | ML Type: | Description: |
|---|---|---|
| Bug ID | dateTime.iso | Time this BR was created |
| PartNumber | string | Part # of buggy product |
| SerialNumber | string | Serial # of product bug was initially found in |
| Description | string | Description of bug |
| orkaround | string | orkaround, if any, for this bug |

## Methods

CreateIncidentReport(Owner, ProductNumber, SerialNumber, Description)

-create a new Incident Report Ticket ID and Incident ID are set automatically

CreateTicket(Owner, ProductNumber, Description)

-create a new Trouble Ticket Ticket ID and Status are set automatically

OpenTicket(Ticket ID)

-opens a Pending or Closed Ticket and makes it an Active Ticket

CloseTicket(Ticket ID, Closer)

-closes an Active Ticket and makes it an Inactive Ticket

DeleteTicket(Ticket ID)

-removes an Inactive Ticket from the system

DeleteIncident(Incident ID)

-removes an Incident Report from the system that either is not associated with a Ticket, or whose Ticket has been deleted

DeleteBug(Bug ID)

-removes a Bug Report from the system

ReturnProduct(SerialNumber)

-updates all Incident Reports to reflect returning of product

GetAllLiveIncidents()

-returns the Incident IDs of all Incident Reports for products in the field

GetAllDeadIncidents()

-returns the Incident IDs of all Incident Reports for products recalled or returned

IsLive(IncidentID)

-returns true if the product is still in the field, false if not

CreateBugReport(PartNumber, SerialNumber, Description, orkaround)

-creates a new Bug Report Bug ID is set automatically

MakeBugReport(Incident ID, orkaround)

-makes a Bug Report out of the Incident Report specified

SetIncidentTicketID(Incident ID)

-set the Ticket ID that an Incident Report belongs to

GetIncidentTicketID(Incident ID)

-returns the Ticket ID that an Incident Report belongs to

GetAll()

-returns all Tickets and Reports

GetAll(Ticket ID, Ticket ID)

-returns an array of all Tickets for a date range

GetTicket(Ticket ID)

-returns Ticket

GetAllBugs()

-returns Tickets IDs of all Bug Reports

GetAllIncidentReports()

-returns all Incident Reports Ticket IDs

GetAllActiveTickets()

-returns all Active Tickets  Ticket IDs

GetAllInactiveTickets()

-returns all Inactive Tickets  Ticket IDs

GetAllActiveTickets(Ticket ID, Ticket ID)

-returns all Active Tickets for a date range

GetAllInactiveTickets(Ticket ID, Ticket ID)

-returns all Inactive Tickets for a date range

GetAllBugReports(Bug ID, Bug ID)

-returns all Bug Reports for a date range

GetAllIncidentReports(Incident ID, Incident ID)

-returns all Incident Reports for a date range

GetAllIncidentReportsByOwner(Owner)

-returns the Incident IDs of all Incident Reports for a specific Owner

GetAllActiveTicketsByOwner(Owner)

-returns the Tickets IDs of all Active Tickets for a specific Owner

GetAllInactiveTicketsByOwner(Owner)

-returns the Tickets IDs of all Inactive Tickets for a specific Owner

GetAllIncidentReportsByOwner(Owner)

-returns the Incident IDs of all Incident Reports for a specific Owner

GetAllIncidentReportsByPart(PartNumber)

-returns the Tickets IDs of all Incident Reports for a specific part

GetAllActiveTicketsByPaty (PartNumber)

-returns the Tickets IDs of all Active Tickets for a specific part

GetAllInactiveTicketsByReporter (PartNumber)

-returns the Tickets IDs of all Inactive Tickets for a specific part

GetAllBugReportsByPart(PartNumber)

-returns the Tickets IDs of all Bug Reports for a specific part

GetOwner(Ticket ID  Incident ID)

-returns the Owner of a Ticket or Incident

GetPart(Ticket ID  Incident ID)

-returns the PartNumber of a Ticket or Incident

GetDescription(Ticket ID)

-returns the Description of a Ticket, Incident or Bug

GetNewestIncident()

-returns the most recently logged Incident Report

GetOldestIncident()

-returns the oldest logged Incident Report

## Load

In order to simulate accesses to the service, a client program will be written to first generate Incident Reports. As the database begins to be populated it will create less Incident Reports while e  ecuting the other web service status-changing and lookup functions more often.