Scheduling Package Refactoring API

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**Abstract**

As part of the Open Source EHR Refactoring project, we have continued working on refactoring the Scheduling module code. This document is to describe what we have done in term of code changes for all interested stakeholders.

# Contents

**1 Introduction 1**

**2 Code Walkthrough 3**

**3 How to use the code 31**

**4 Installation 32**

**5 Conclusions 32**

# Introduction

The overarching goal of any code changes we implement is to make the VistA code more modular and readable without altering functionality. *Problem List* was chosen as the first module to be refactored because it has a moderate number of dependencies to other packages, allowing our team to finalize a refactoring strategy and allocate ample time for certification. To date, we have completed a *Problem List* application programming interface (API) that is used both by the roll-and-scroll interface and CPRS.

With the lessons learned from *Problem List*, we are now applying these and our refactoring methodology to *Scheduling*. This module has a significant number of dependencies to other VistA packages, and thus requires an increased concentration to the interactions it has within the system and how we will develop an API. Our team has prepared a dependency document [*RGI\_Open Source EHR Refactoring Services\_Scheduling Dependency Notes.docx*] outlining these interactions and it is available on our project page on the OSEHRA website [<http://www.osehra.org/group/ehr-refactoring-services>]. We have specifically chosen this module in order to align with VA’s active search into improving scheduling functionality within VistA; any refactoring completed by our project team should be helpful to future *Scheduling* design and implementation efforts..

*Scheduling* has a well-defined API for the core information that is being used by its dependent packages; details on this API may be found in the PIMS Technical Manual [<http://www.va.gov/vdl/documents/Clinical/Scheduling/pimstm.pdf>]. However, this API is read-only, meaning it provides the ability to view currently scheduled appointments but is not being used by the roll-and-scroll interface. Currently there appears to be no API for the core *Scheduling* functionality of making appointments, check-ins and check-outs, etc.

There is an additional API that is being used by the Primary Care Management module, *Managed Care*. This module does not deal directly with the core *Scheduling* functionality, and thus its interactions with the module can be considered unique and separate; it has a graphical user interface (GUI) and gets/sets its associated data through RPC tags within the *Scheduling* module.

Additionally, we found that there are a number of packages that currently use globals belonging to *Scheduling* directly. Details on these packages can be found in the dependency notes document. (Within the roll-and-scroll interface, routines using globals directly is considered the norm, not the exception.)

Since there is a well-defined API for reading *Scheduling* data, we have focused on the roll-and-scroll interface that is being used for making, changing, or editing appointments. Most of this core functionality resides under the Appointment Management option. We have applied the methodology used for *Problem List* and developed an API that is capable of exposing most of the functionality of the Appointment Management menu. Similar to the API created for *Problem List*, we have worked to minimize direct global access and the number of assumed variables within the *Scheduling* API.

# Code Walkthrough

Several APIs were developed during the refactoring effort. They are described below.

## 2.1 Clinic management API

Unless otherwise noted all date formats are internal FileMan format (e.g. 3120121 = Jan 21, 2012).

## $$GETCLN^SDMAPI1() - Return Clinic details

This extrinsic function returns detailed information on a clinic.

##### Format

$$GETCLN^SDMAPI1(.RETURN,CLN)

##### Input Parameters

.RETURN [Required,Array] Array passed by reference that will receive the data. All fields are returned as internal\_format^external\_format. Fields returned:

RETURN(“CREDIT STOP CODE”) [Numeric] Pointer to CLINIC STOP file

RETURN(“DEFAULT APPOINTMENT TYPE”) [Numeric] Pointer to APPOINTMENT TYPE file

RETURN(“DISPLAY INCREMENTS PER HOUR”) [Numeric] 1:60-MIN, 2:30-MIN, 4:15-MIN, 3:20-MIN, 6:10-MIN

RETURN(“HOUR CLINIC DISPLAY BEGINS”) [Numeric]

RETURN(“INACTIVATE DATE”) [DateTime]

RETURN(“LENGTH OF APP'T”) [Numeric]

RETURN(“MAX # DAYS FOR AUTO-REBOOK”) [Numeric]

RETURN(“MAX # DAYS FOR FUTURE BOOKING”) [Numeric]

RETURN(“NAME”) [String]

RETURN(“NON-COUNT CLINIC?”) [String] Y:YES,N:NO

RETURN(“OVERBOOKS/DAY MAXIMUM”) [Numeric]

RETURN(“PRIVILEGED USER”,IEN) – [Numeric] List of users that have the right to make appointments.

RETURN(“PROHIBIT ACCESS TO CLINIC?”) [String] Y:YES

RETURN(“REACTIVATE DATE”) [DateTime] Date clinic was reactivated

RETURN(“SCHEDULE ON HOLIDAYS?”) [String] Y:YES

RETURN(“STOP CODE NUMBER”) [Numeric] Three digit stop code number assigned to specific location

RETURN(“TYPE”) [String] Type of clinic (one of the codes returned by LSTHLTP^SDMAPI1)

RETURN(“VARIABLE APP'NTMENT LENGTH”) [String] V:YES

CLN [Required,Numeric] Clinic IEN

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

CLNNFND Clinic not found.

## $$LSTCLNS^SDMAPI1() - Return clinics filtered by name

This extrinsic function returns a list of clinics filtered by name.

##### Format

$$LSTCLNS^SDMAPI1(.RETURN,SEARCH,.START,NUMBER)

##### Input Parameters

.RETURN [Required,Array] Array passed by reference that will receive the data.

RETURN(#,”ID”) – [Numeric] Clinic IEN

RETURN(#,”NAME”) – [String] Clinic name

SEARCH [Optional,String] Partial match restriction. Default: All entries

.START [Required,Numeric] The clinic name from which to begin the list.

NUMBER [Optional,Numeric] Number of entries to return. Default: All entries

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

None

## $$SLOTS^SDMAPI1() – Get available slots

This extrinsic function returns the available slots for a clinic.

##### Format

$$SLOTS^SDMAPI1(.RETURN,SC)

##### Input Parameters

.RETURN [Required,Array] Array passed by reference that will receive the data

RETURN(DATE,1) – [String] Availability string

SC [Required,Numeric] Clinic IEN

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

None

## $$FRSTAVBL^SDMAPI1() - Find first available appointment date

This extrinsic function finds the first available appointment date for a clinic.

##### Format

$$FRSTAVBL^SDMAPI1(.RETURN,SC)

##### Input Parameters

.RETURN [Required,DateTime] Passed by reference, set to the first available date.

SC [Required,Numeric] Clinic IEN

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

None

## $$GETAPTS^SDMAPI1() - Get patient appointments

This extrinsic function returns a list of patient appointments.

##### Format

$$GETAPTS^SDMAPI1(.RETURN,DFN,SD)

##### Input Parameters

.RETURN [Required] Array passed by reference that will receive the data

RETURN(“APT”,DT,” APPOINTMENT DATE/TIME”) – [DateTime] Date of appointment

RETURN(“APT”,DT,” APPOINTMENT TYPE”) – [Numeric] Type of appointment (pointer to APPOINTMENT TYPE file)

RETURN(“APT”,DT,” APPT. CANCELLED”) – [Numeric] Clinic in which the patient had a scheduled appointment which was cancelled to set this appointment

RETURN(“APT”,DT,” CANCELLATION REASON”) – [Numeric] Cancellation reason (pointer to CANCELLATION REASONS file)

RETURN(“APT”,DT,” CANCELLATION REMARKS”) – [String] Cancellation remarks

RETURN(“APT”,DT,”CLINIC”) – [Numeric] Clinic

RETURN(“APT”,DT,” COLLATERAL VISIT”) – [Boolean] Collateral visit

RETURN(“APT”,DT,” CURRENT STATUS”) – [String] Current status of appointment

RETURN(“APT”,DT,” DATA ENTRY CLERK”) – [Numeric] User who made appointment

RETURN(“APT”,DT,” PURPOSE OF VISIT”) – [Numeric] Type of appointment

RETURN(“APT”,DT,” STATUS”) – [String] Appointment status

DFN [Required,Numeric] Patient IEN

SD [Optional,DateTime] – if not set returns all patient appointments.

* If SD is set to a valid date-time returns the corresponding appointment.
* If SD(0) is set (0/1) returns patient appointments before/after specified date (SD).

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

INVPARAM Invalid parameter value

PATNFND Patient not found.

## $$HASPEND^SDMAPI1() – Check if patient has pending appointments

This extrinsic function verifies if a patient has pending appointments.

##### Format

$$HASPEND^SDMAPI1(.RETURN,DFN,DT)

##### Input Parameters

.RETURN [Required,Boolean] Set to 1 if the patient has pending appointments, 0 otherwise

DFN [Required,Numeric] Patient IEN

DT [Required,DateTime] Start date

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

PATNFND Patient not found.

## $$GETPEND^SDMAPI1() - Return patient pending appointments

This extrinsic function returns a list of patient pending appointments.

##### Format

$$GETPEND^SDMAPI1(.RETURN,DFN,DT)

##### Input Parameters

.RETURN [Required,Array] Array passed by reference that will receive the data

RETURN(APPTDT,” APPOINTMENT TYPE”) – [Numeric] Type of appointment

RETURN(APPTDT,” CLINIC”) – [Numeric] Clinic

RETURN(APPTDT,” COLLATERAL VISIT”) – [Boolean] Collateral visit

RETURN(APPTDT,” CONSULT LINK”) – [Numeric]

RETURN(APPTDT,” EKG DATE/TIME”) – [DateTime]

RETURN(APPTDT,” LAB DATE/TIME”) – [DateTime]

RETURN(APPTDT,” LENGTH OF APP'T”) – [Numeric] Length of appointment

RETURN(APPTDT,” X-RAY DATE/TIME”) – [DateTime]

DFN [Required,Numeric] Patient IEN

DT [Required,DateTime] Start date

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

INVPARAM Invalid parameter value

PATNFND Patient not found.

## 2.2 Appointment management API

## $$MAKE^SDMAPI2() - Make appointment

This extrinsic function creates a new appointment.

##### Format

$$MAKE^SDMAPI2(.RETURN,DFN,SC,SD,TYPE,STYP,LEN,SRT,OTHR,CIO,LAB,XRAY,EKG,RQXRAY,CONS,LVL)

##### Input Parameters

.RETURN [Required,Boolean] Set to 1 if the update succeeded, 0 otherwise

RETURN(0) – [String] Error code^Text^Level (1 for error, 2 for warning, 3 for warning)

DFN [Required,Numeric] Patient IEN

SC [Required,Numeric] Clinic IEN

SD [Required,DateTime] Appointment date

TYPE [Required,Numeric] Purpose of visit (drawn from the Appointment Types list – see $$LSTAPPT^SDMAPI1)

STYP [Optional,Numeric] Sub-category associated with this appointment (one of the codes returned by LSTSBCTG^DGSAAPI)

LEN [Required,Numeric] Appointment length in minutes.

SRT [Required,String] Scheduling request type (one of the codes returned by LSTSRT^SDMAPI1)

OTHR [Optional,String] Any other tests ordered in association with the appointment

CIO [Optional,String] If set to “CI” the appointment will be checked-in.

LAB [Optional,DateTime] If this patient is scheduled for laboratory tests in conjunction with this appointment, set LAB to the date/time the patient should report to the lab for these tests.

XRAY [Optional,DateTime] If this patient is scheduled for laboratory tests in conjunction with this appointment, set LAB to the date/time the patient should report to the lab for these tests.

EKG [Optional,DateTime] If this patient is scheduled for laboratory tests in conjunction with this appointment, set LAB to the date/time the patient should report to the lab for these tests.

RQXRAY [Optional,Boolean] Set to 1 if x-ray films are required for this appointment.

CONS [Optional,Numeric] Consult associated with this appointment (pointer to Request/Consultation file).

LVL [Optional,Numeric]

* Forces appointment creation if it is set to 1 (ignores all warnings described below)
* If set to 2 will return an error if there are no open slots
* If set to anything higher that 2 or left undefined, will return an error if the patient has an active appointment on same time, or on same day, or a canceled appointment on same time, or if there are no open slots.

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

APTCINV Clinic is scheduled to be inactivated on …

APTCBCP  CAN'T BOOK WITHIN A CANCELLED TIME PERIOD

APTCLUV There is no available slot for this date/time.

APTEXCD  EXCEEDS MAXIMUM DAYS FOR FUTURE APPOINTMENT!!

APTEXOB WILL EXCEED MAXIMUM ALLOWABLE OVERBOOKS,

APTNOST NO OPEN SLOTS THEN

APTOAPD ONLY … OVERBOOKS PER DAY!!

APTOVBK OVERBOOK!

APTOVOS  THAT TIME IS NOT WITHIN SCHEDULED PERIOD!

APTOAPD  ONLY … OVERBOOK PER DAY!!

APTPAHA  PATIENT ALREADY HAS APPOINTMENT … THEN.

APTPAHCO PATIENT ALREADY HAS APPOINTMENT … THEN.

APTPAHU Patient already has an appt on …

APTPCLA Appointment date is prior to the clinic's availability date.

APTPHSD  PATIENT ALREADY HAS APPOINTMENT ON THE SAME DAY …

APTPPAB Appointment date is prior to the patient's date of birth.

APTPPCP THIS TIME WAS PREVIOUSLY CANCELLED BY THE PATIENT …

APTSHOL HOLIDAY??

APTNOST  NO OPEN SLOTS THEN

APTWHEN WHEN??

CLNNFND Clinic not found.

CLNURGT Access to … is prohibited! Only users with a special code may access this clinic.

INVPARAM Invalid parameter value

PATDIED PATIENT HAS DIED.

PATNFND Patient not found.

STYPNFND Appointment subtype not found or inactive.

TYPINVD Patient must have the eligibility code EMPLOYEE, COLLATERAL or SHARING AGREEMENT to choose those types of appointments.

TYPINVSC The 'SC Percent','Service Connected' and 'Primary Eligibility Codes' are OUT OF SYNC, Please CORRECT the problem.

TYPNFND Appointment type not found.

## $$MAKEUS^SDMAPI2() – Make unscheduled appointment

This extrinsic function creates a new unscheduled appointment.

##### Format

$$MAKEUS^SDMAPI2(.RETURN,DFN,SC,SD,TYP,STYP)

##### Input Parameters

.RETURN [Required,Boolean] Set to 1 if the update succeeded, 0 otherwise

RETURN(0) – [String] Error code^Text^Level (1 for error, 2 for warning, 3 for warning)

DFN [Required,Numeric] Patient IEN

SC [Required,Numeric] Clinic IEN

SD [Required,DateTime] Appointment date

TYP [Required,Numeric] Purpose of visit

STYP [Optional,Numeric] Sub-category associated with this appointment (one of the codes returned by LSTSBCTG^DGSAAPI)

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

APTCINV Clinic is scheduled to be inactivated on …

APTCIPE You cannot check in this appointment.

APTCITS  It is too soon to check in this appointment.

APTCOCE >>> You can not check out this appointment.

APTCOTSIt is too soon to check out this appointment.

APTCOCN You cannot check out this appointment.

APTCOAC Appointment already checked out

APTCONW Appointment new encounter

APTLOCK Another user is editing this record. Trying again.

APTPAHU Patient already has an appt on …

CLNINV Invalid Clinic.

CLNSCIN Invalid Clinic Stop Code …

CLNSCNR Clinic's Stop Code … has no restriction type ...

CLNSCPS Clinic's Stop Code … cannot be …

CLNSCRD Clinic's Stop Code … cannot be used. Restriction date is …

CLNNFND Clinic not found.

INVPARAM Invalid parameter value

PATDIED PATIENT HAS DIED.

PATNFND Patient not found.

STYPNFND Appointment subtype not found or inactive.

TYPINVD Patient must have the eligibility code EMPLOYEE, COLLATERAL or SHARING AGREEMENT to choose those types of appointments.

TYPINVSC The 'SC Percent','Service Connected' and 'Primary Eligibility Codes' are OUT OF SYNC, Please CORRECT the problem.

TYPNFND Appointment type not found.

## $$CANCEL^SDMAPI2() - Cancel appointment

This extrinsic function cancels an existing appointment.

##### Format

$$CANCEL^SDMAPI2(.RETURN,DFN,SC,SD,TYP,RSN,RMK)

##### Input Parameters

.RETURN [Required,Boolean] Set to 1 if the update succeeded, 0 otherwise

RETURN(0) – [String] Error code^Text^Level (1 for error, 2 for warning, 3 for warning)

DFN [Required,Numeric] Patient IEN

SC [Required,Numeric] Clinic IEN

SD [Required,DateTime] Appointment date

TYP [Required,String] Status (one of the codes returned by LSTAPPST^SDMAPI1)

RSN [Required,Numeric] Cancellation reason (one of the codes returned by LSTCRSNS^SDMAPI1)

RMK [Optional,String] Remarks

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

APTCAND Appointment already cancelled

APTCCHO Appointment has a check out date and cannot be cancelled.

APTCRGT Appt. … NOT CANCELLED. Access to this clinic is restricted to only privileged users!

APTCNPE You cannot cancel this appointment.

CLNNFND Clinic not found.

INVPARAM Invalid parameter value

PATNFND Patient not found.

RSNNFND Cancellation reason not found.

## $$NOSHOW^SDMAPI2() - Mark appointment as no-show

This extrinsic function marks an existing appointment as no-show.

##### Format

$$NOSHOW^SDMAPI2(.RETURN,DFN,SC,SD,LVL)

##### Input Parameters

.RETURN [Required,Boolean] Set to 1 if the update succeeded, 0 otherwise

DFN [Required,Numeric] Patient IEN

SC [Required,Numeric] Clinic IEN

SD [Required,DateTime] Appointment date

LVL [Optional,Numeric]

* If set to 1, unconditionally marks the appointment as no show
* If set to anything else than 1 or left undefined will return an error if any of the checks failed (for instance if the appointment was already marked as no show).

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

APTNSAL ALREADY RECORDED AS NO-SHOW... WANT TO ERASE

APTNSAR THIS APPOINTMENT ALREADY A NO-SHOW AND REBOOKED... ARE YOU SURE YOU WANT TO ERASE

APTNSCE You cannot execute no-show processing for this appointment.

APTNSIA Inpatient Appointments cannot reflect No-Show status!

CLNNFND Clinic not found.

INVPARAM Invalid parameter value

PATNFND Patient not found.

## $$CHECKIN^SDMAPI2() - Check in appointment

This extrinsic function checks in an existing appointment.

##### Format

$$CHECKIN^SDMAPI2(.RETURN,DFN,SD,SC,CIDT)

##### Input Parameters

.RETURN [Required,Boolean] Set to 1 if the check in succeeded, 0 otherwise

RETURN(0) – [String] Error code^Text^Level (1 for error, 2 for warning, 3 for warning)

DFN [Required,Numeric] Patient IEN

SD [Required,DateTime] Appointment date

SC [Required,Numeric] Clinic IEN

CIDT [Optional,DateTime] Date and time the patient was checked in for the appointment

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

APTCIPE You cannot check in this appointment.

APTCITS  It is too soon to check in this appointment.

CLNNFND Clinic not found.

INVPARAM Invalid parameter value

PATNFND Patient not found.

## $$CHECKO^SDMAPI4() - Check out appointment

This extrinsic function checks out an existing appointment.

##### Format

$$CHECKO^SDMAPI2(.RETURN,DFN,SD,SC)

##### Input Parameters

.RETURN [Required,Boolean] Set to 1 if the check-in succeeded, 0 otherwise

RETURN(0) – [String] Error code^Text^Level (1 for error, 2 for warning, 3 for warning)

RETURN(“COD”) – [DateTime] Checked out date/time

RETURN(“COVISIT”) – [Boolean] Collateral visit (1=this patient has been seen as a collateral for another patient)

RETURN(“LOCATION”) – [Numeric] Encounter location (pointer to file 44)

RETURN(“SDOE”) – [Numeric] Pointer to the corresponding outpatient encounter (file 409.68)

RETURN(“VISIT”) – [Numeric] Visit file entry (pointer to file 9000010)

DFN [Required,Numeric] Patient IEN

SD [Required,DateTime] Appointment date

SC [Required,Numeric] Clinic IEN

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

APTCOCE >>> You can not check out this appointment.

APTCOTSIt is too soon to check out this appointment.

APTCOCN You cannot check out this appointment.

APTCOAC Appointment already checked out

APTCONW Appointment new encounter

CLNNFND Clinic not found.

INVPARAM Invalid parameter value

PATNFND Patient not found.

## $$DELCOSD^SDMAPI4() - Delete check out (scheduling)

This extrinsic function deletes an existing appointment check out.

##### Format

$$DELCOSD^SDMAPI4(.RETURN,DFN,SD)

##### Input Parameters

.RETURN [Required,Boolean] Set to 1 if the check in succeeded, 0 otherwise

RETURN(0) – [String] Error code^Text^Level (1 for error, 2 for warning, 3 for warning)

DFN [Required,Numeric] Patient IEN

SD [Required,DateTime] Appointment date

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

APTCOSU You must have the 'SD SUPERVISOR' key to delete an appointment check out.

APTDCODThe appointment must have a check out date/time to delete.

APTDCOO >>> Editing and deleting old encounters not allowed.

CLNNFND Clinic not found.

INVPARAM Invalid parameter value

PATNFND Patient not found.

## 2.3 Vocabularies API

## $$GETAPPT^SDMAPI1() - Get Appointment Type details

This extrinsic function returns detailed information about an appointment type.

##### Format

$$GETAPPT^SDMAPI1(.RETURN,TYPE)

##### Input Parameters

.RETURN [Required,Array] Array passed by reference that will receive the data.

RETURN(“NAME”) – [String] Appointment type name

RETURN(“NUMBER”) – [Numeric] Appointment type IEN

RETURN(“SYNONIM”) – [String] Appointment type synonim

TYPE [Required,Numeric] Appointment type IEN (File 409.1)

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

None

## $$GETELIG^SDMAPI1() - Return Eligibility Code details

This extrinsic function returns detailed information about an eligibility code.

##### Format

$$GETELIG^SDMAPI1(.RETURN,ELIG)

##### Input Parameters

.RETURN [Required,Array] Array passed by reference that will receive the data

RETURN(“ABBREVIATION”) [String] Eligibility Code abbreviation

RETURN(“MAS ELIGIBILITY CODE”) [Numeric]

RETURN(“NAME”) [String] Eligibility Code name

RETURN(“PRINT NAME”) [String] Eligibility Code print name

RETURN(“TYPE”) [String] Eligibility Code type (N:NON VETERAN,Y:VETERAN)

RETURN(“VA CODE NUMBER”) [Numeric] VA Code Number

RETURN(“INACTIVE”) [Boolean] Eligibility Code status

ELIG [Required,Numeric] Eligibility code IEN

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

None

## $$LSTAPPT^SDMAPI1() - List appointment types filtered by name

This extrinsic function returns a list of appointment types. The list can be filtered by name.

##### Format

$$LSTAPPT^SDMAPI1(.RETURN,SEARCH,START,NUMBER)

##### Input Parameters

.RETURN                  [Required,Array] Array passed by reference that will receive the data

                                    RETURN(0) – [String] # of entries found^maximum requested^any more?^flags

(consistent with LIST^DIC header node)

                                    RETURN(#,”ID”) – [Numeric] Appointment type IEN

                                    RETURN(#,”NAME”) – [String] Appointment type name

SEARCH                    [Optional,String] Partial match restriction. Default: All entries

START                       [Optional,Numeric] The appointment type name from which to begin the list. Default: “”

NUMBER                  [Optional,Numeric] Number of entries to return. Default: All entries

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

None

## $$LSTAPPST^SDMAPI1() - List appointment statuses

This extrinsic function returns a list of appointment status codes.

##### Format

$$LSTAPPST^SDMAPI1(.RETURN)

##### Input Parameters

.RETURN                  [Required,Array] Array passed by reference that will receive the data

                                    RETURN(0) – [Numeric] # of entries found

                                    RETURN(#) – [String] code^display\_name

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

None

## $$LSTHLTP^SDMAPI1() - List hospital location types

This extrinsic function returns a list of hospital location types.

##### Format

$$LSTHLTP^SDMAPI1(.RETURN)

##### Input Parameters

.RETURN                  [Required,Array] Array passed by reference that will receive the data

                                    RETURN(0) – [Numeric] # of entries found

                                    RETURN(#) – [String] code^display\_name

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

None

## $$LSTCRSNS^SDMAPI1() - List cancellation reasons filtered by name

This extrinsic function returns a list of cancellation reasons. The list can be filtered by name.

##### Format

$$LSTCRSNS^SDMAPI1(.RETURN,SEARCH,START,NUMBER)

##### Input Parameters

.RETURN                  [Required,Array] Array passed by reference that will receive the data

                                    RETURN(0) – [String] # of entries found^maximum requested^any more?^flags

(consistent with LIST^DIC header node)

                                    RETURN(#,”ID”) – [Numeric] Cancellation reason IEN

                                    RETURN(#,”NAME”) – [String] Cancellation reason name

SEARCH                    [Optional,String] Partial match restriction. Default: All entries

START                       [Optional,Numeric] The entry from which to begin the list. Default: “”

NUMBER                  [Optional,Numeric] Number of entries to return. Default: All entries

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

None

## $$LSTSRT^SDMAPI1() - List scheduling request types

This extrinsic function returns a list of scheduling request types. The list can be filtered by name.

##### Format

$$LSTSRT^SDMAPI1(.RETURN)

##### Input Parameters

.RETURN                  [Required,Array] Array passed by reference that will receive the data

                                    RETURN(0) – [Numeric] # of entries found

                                    RETURN(#) – [String] code^display\_name

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

None

## $$LSTSBCTG^DGSAAPI() - List sharing agreement sub-categories filtered by name

This extrinsic function returns a list of sharing agreement sub-categories. The list can be filtered by name.

##### Format

$$LSTSBCTG^DGSAAPI (.RETURN,SEARCH,START,NUMBER)

##### Input Parameters

.RETURN                  [Required,Array] Array passed by reference that will receive the data

                                    RETURN(0) – [Numeric] # of entries found

                                    RETURN(#) – [String] IEN^name

SEARCH                    [Optional,String] Partial match restriction. Default: All entries

START                       [Optional,Numeric] The entry from which to begin the list. Default: “”

NUMBER                  [Optional,Numeric] Number of entries to return. Default: All entries

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

None

## 2.4 Electronic Wait List API

## $$LIST^SDWLAPI1() - List EWL entries for patient

This extrinsic function returns the list of a patient EWL entries.

##### Format

$$LIST^SDWLAPI1(.RETURN,DFN,STATUS,BEGIN,END)

##### Input Parameters

.RETURN [Required,Numeric] Array passed by reference that will receive the data

RETURN [Numeric] # of entries found

RETURN(#,"DISPTYPE") [String]Disposition type

RETURN(#,"IEN") [Numeric]EWL entry IEN

RETURN(#,"INSTITUTION") [Numeric]Institution

RETURN(#,"ORIGDT") [DateTime] Originating date

RETURN(#,"PRIORITY") [String] Priority (A:ASAP,F:FUTURE)

RETURN(#,"STATUS") [String] Status (O:OPEN,C:CLOSED)

RETURN(#,"WAITFOR") [Numeric] Pointer to Team/Position/Specialty/Clinic depending on Wait List Type

RETURN(#,"WLTYPE") [Numeric] Wait List Type

DFN [Required,Numeric] Patient IEN

STATUS [Optional,String] EWL entry status (O=Open, C=Closed, “”=Both). Default “”

BEGIN [Optional,DateTime] Start date

END [Optional,DateTime] End date

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

INVPARAM Invalid parameter value

PATNFND Patient not found.

## $$DETAIL^SDWLAPI1() – Wait List entry detailed information

This extrinsic function returns detailed information for a EWL entry

##### Format

$$DETAIL^SDWLAPI1(.RETURN,IEN)

##### Input Parameters

.RETURN [Required] Array passed by reference that will receive the data

RETURN("APPTCLERK") [Numeric] Who made the appointment

RETURN("APPTCLIN") [Numeric] Appointment clinic

RETURN("APPTCREDSC") [Numeric] Appointment credit stop code

RETURN("APPTDATE") [DateTime] Date appointment made

RETURN("APPTINST") [Numeric] Appointment institution

RETURN("APPTSC") [Numeric] Appointment stop code

RETURN("APPTSCHED") [DateTime] Scheduled date of appointment

RETURN("APPTSN") [String] Appointment station number

RETURN("APPTSTATUS") [String] Appointment status

RETURN("CHDCLINP") [Numeric] Changed clinic parent pointer

RETURN("CMNTS") [String] Comment

RETURN("DISPBY") [Numeric] Dispositioned by

RETURN("DISPDT") [DateTime] Date dispositioned

RETURN("DISPTYPE") [String] Disposition

RETURN("DNRCMT") [String] Do not remove comment

RETURN("DNRDT") [DateTime] Do not remove date

RETURN("DNRRSN") [String] Do not remove reason

RETURN("DNRUSR") [Numeric] User entering no remove

RETURN("DSRDDT") [DateTime]Desired date of appointment

RETURN("ENTEREDBY") [Numeric] Originating user

RETURN("INSTITUTION") [Numeric] Institution

RETURN("ORIGDT") [DateTime] Originating date

RETURN("PATIENT") [Numeric] Patient

RETURN("PRIORITY") [String] Priority

RETURN("PROVIDER") [Numeric] Provider

RETURN("REOPENCMT") [String] Reopen comment

RETURN("REOPENRSN") [String] Reopen reason

RETURN("REQBY") [Numeric] Request by

RETURN("SCPRIORITY") [Boolean] Service connected priority

RETURN("STATUS") [String] Status

RETURN("WAITFOR") [Numeric] Pointer to Team/Position/Specialty/Clinic depending on Wait List Type

RETURN("WLTYPE") [Numeric] Wait List Type

IEN [Required,Numeric] EWL entry IEN

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

INVPARAM Invalid parameter value

## $$NEW^SDWLAPI1() – Add new EWL entry

This extrinsic function creates a new EWL entry

##### Format

$$NEW^SDWLAPI1(.RETURN,.SDWLD)

##### Input Parameters

.RETURN [Required,Numeric] Will return the new IEN if the call succeeded, 0 otherwise

.SDWLD [Required,Array] Array containing the data to be saved

SDWLD("WLTYPE") [Numeric]Wait List Type

SDWLD("PATIENT") [Numeric] Patient

SDWLD("INSTITUTION") [Numeric] Institution

SDWLD("WAITFOR") [Numeric]Pointer to Team/Position/Specialty/Clinic depending on Wait List Type

SDWLD("PRIORITY") [String] Priority

SDWLD("REQBY") [Numeric] Request by

SDWLD("PROVIDER") [Numeric] Provider

SDWLD("SCPRCNT") [Numeric] Service connected percentage

SDWLD("SCPRIORITY") [Boolean] Service connected priority

SDWLD("DSRDDT") [DateTime] Desired date of appointment

SDWLD("CMNTS") [String] Comments

SDWLD("ENRSTAT") [String] EWL enrollee status

SDWLD("ENRDU") [DateTime] EWL enrollee date used

SDWLD("ENRDF") [String] EWL enrollee database file

SDWLD("TICKLER") [Boolean] Scheduling reminder flag

SDWLD("CHDCLINP") [Numeric] Changed clinic parent pointer

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

INVPARAM Invalid parameter value

## $$UPDATE^SDWLAPI1() – Update EWL entry

This extrinsic function returns a list of cancellation reasons. The list can be filtered by name.

##### Format

$$UPDATE^SDWLAPI1(.RETURN,SDWLIEN,.SDWLD)

##### Input Parameters

.RETURN [Required,Boolean] Set to 1 if the the update succeeded, 0 otherwise

SDWLIEN [Required,Numeric] IEN of the EWL entry to be updated

.SDWLD [Required,Array] Array containing the data to be saved

SDWLD("WLTYPE") [Numeric] Wait List Type

SDWLD("INSTITUTION") [Numeric] Institution

SDWLD("WAITFOR") [Numeric] Pointer to Team/Position/Specialty/Clinic depending on Wait List Type

SDWLD("PRIORITY") [String] Priority

SDWLD("REQBY") [Numeric] Request by

SDWLD("PROVIDER") [Numeric] Provider

SDWLD("SCPRCNT") [Numeric] Service connected percentage

SDWLD("SCPRIORITY") [Boolean] Service connected priority

SDWLD("DSRDDT") [DateTime] Desired date of appointment

SDWLD("CMNTS") [String] Comments

SDWLD("ENRSTAT") [String] EWL enrollee status

SDWLD("REJECTED") [Boolean] Rejection flag

SDWLD("TICKLER") [Boolean] Scheduling reminder flag

SDWLD("INTRATF") [Boolean] Intra-transfer flag

SDWLD("MULTITEAM") [Boolean] Multi team flag

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

INVPARAM Invalid parameter value

## $$DISP^SDWLAPI1() – Disposition entry

This extrinsic function update the disposition data for an EWL entry.

##### Format

$$DISP^SDWLAPI1(.RETURN,SDWLDFN,SDWLIEN,SDWLDISP,.SDWLAPPT)

##### Input Parameters

.RETURN [Required,Boolean] Set to 1 if the update succeeded, 0 otherwise

SDWLDFN [Required,Numeric] Patient IEN

SDWLIEN [Required,Numeric] EWL entry IEN

SDWLDISP [Required,String] Disposition type (D:DEATH, NC:REMOVED/NON-VA CARE, SA:REMOVED/SCHEDULED-ASSIGNED, CC:REMOVED/VA CONTRACT CARE, NN:REMOVED/NO LONGER NECESSARY, ER:ENTERED IN ERROR, TR:TRANSFERRED)

.SDWLAPPT [Optional,Array] Array containing appointment data (saved if disposition type is “SA”)

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

INVPARAM Invalid parameter value

## $$DELETE^SDWLAPI1() – Delete EWL entry

This extrinsic function deletes an existing EWL entry

##### Format

$$DELETE^SDWLAPI1(.RETURN,SDWLIEN)

##### Input Parameters

.RETURN [Required,Boolean] Set to 1 if the delete succeeded, 0 otherwise

SDWLIEN [Required,Numeric] EWL entry IEN

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

INVPARAM Invalid parameter value

## $$HASENTRY^SDWLAPI1() – Patient is on EW List?

This extrinsic function checks if patient has entries on the Electronic Wait List

##### Format

$$HASENTRY^SDWLAPI1(.RETURN,DFN)

##### Input Parameters

.RETURN [Required,Boolean] Set to 1 if the patient has EWL entries on file, 0 otherwise

DFN [Required,Numeric] Patient IEN.

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

INVPARAM Invalid parameter value

## 2.5 Encounter utilities API

## $$GETSCAP^SDMAPI1() – Get clinic appointment

This extrinsic function returns detailed information for an appointment.

##### Format

$$GETSCAP^SDMAPI1(.RETURN,SC,DFN,SD)

##### Input Parameters

.RETURN [Required] Array passed by reference that will receive the data

RETURN [Boolean] Set to 1 if the the call succeeded, 0 otherwise

RETURN("CHECKIN") [DateTime] Check in date

RETURN("CHECKOUT") [DateTime] Check out date

RETURN("CONSULT") [Numeric] Consult associated with this appointment (pointer to REQUEST/CONSULTATION FILE <#123>)

RETURN("DATE") [DateTime] Date appointment made

RETURN("IFN") [Numeric]Clinic appointment IEN

RETURN("LENGTH") [Numeric] Appontment length (minutes)

RETURN("USER") [Numeric]Data entry clerk IEN

SC [Required,Numeric] Clinic IEN

DFN [Required,Numeric] Patient IEN

SD [Required,DateTime] Appointment date

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

INVPARAM Invalid parameter value

PATNFND Patient not found.

CLNNFND Clinic not found.

## $$DISCH^SDMAPI3() – Discharge from clinic

This extrinsic function discharges a patient from the clinic he is enrolled in.

##### Format

$$DISCH^SDMAPI3(.RETURN,.ENS,DFN)

##### Input Parameters

.RETURN [Required,Boolean] Set to 1 if the discharge succeeded, 0 otherwise

.ENS [Optional,Array]

ENS(clinic\_ien,”IEN”) [Numeric] Enrollment IEN

ENS(clinic\_ien,”EN”,#,”DISCHARGE”) [DateTime] Date of discharge

ENS(clinic\_ien,”EN”,#,”REASON”) [String] Reason for discharge

DFN [Required,Numeric] Patient IEN

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

INVPARAM Invalid parameter value

PATNFND Patient not found.

PATDARD PATIENT ALREADY DISCHARGED FROM CLINIC

PATDNEN Patient not enrolled in clinic.

PATDHFA PATIENT HAS FUTURE APPOINTMENTS, MUST BE CANCELLED PRIOR TO DISCHARGE !!

## $$GETPENRL^SDMAPI3() – Get patient enrollments filtered by status

This extrinsic function returns the list of a patient enrollment events filtered by clinic and enrollment status.

##### Format

$$GETPENRL^SDMAPI3(.RETURN,DFN,SC,STAT)

##### Input Parameters

.RETURN [Required] Array passed by reference that will receive the data

RETURN [Boolean] Set to 1 if the the call succeeded, 0 otherwise

RETURN(clinic\_ien,"EN",#,”DISCHARGE”) [DateTime] Date of discharge

RETURN(clinic\_ien,"EN",#,”ENROLLMENT”) [DateTime] Date of enrollment

RETURN(clinic\_ien,"EN",#,”OA”) [String]Outpatient/Ambulatory (O: outpatient, A: ambulatory care)

RETURN(clinic\_ien,"EN",#,”REASON”) [String] Reason for discharge

RETURN(clinic\_ien,"EN",#,”REVIEW”) [DateTime] Review date

RETURN(clinic\_ien,"IFN") [Numeric] Enrollment IEN

RETURN(clinic\_ien,"NAME") [String] Enrollment clinic name

RETURN(clinic\_ien,”STATUS”) [String] Enrollment status (I: inactive)

DFN [Required,Numeric] Patient IEN

SC [Optional,Numeric] Clinic IEN

STAT [Optional,String] Status (0: both active and inactive, 1: active only)

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

INVPARAM Invalid parameter value

PATNFND Patient not found.

## $$GETOE^SDMAPI4() – Get outpatient encounter data

This extrinsic function returns detailed information about an outpatient encounter.

##### Format

$$GETOE^SDMAPI4(.RETURN,SDOE)

##### Input Parameters

.RETURN [Required] Array passed by reference that will receive the data

RETURN [Boolean] Set to 1 if the the call succeeded, 0 otherwise

RETURN(“CLINIC”) [Numeric]Clinic IEN

RETURN(“DATE”) [DateTime]Encounter date

RETURN(“PATIENT”) [Numeric]Patient IEN

RETURN(“SCODE”) [Numeric] Clinic stop code

RETURN(“VISIT”) [Numeric] Visit IEN

SDOE [Required,Numeric] Outpatient encounter IEN

##### Output

A Boolean value signaling if the call was successful or not.

##### Error Codes Returned

None

# GLOSSARY

IEN Internal Entry Number. The number used to identify an entry within a file. Every record has a unique internal entry number. Often abbreviated as IEN.

STOP CODE A three-digit number corresponding to an additional stop/service a patient received in conjunction with a clinic visit.

Stop code entries are used so that medical facilities may receive credit for the services rendered during a patient visit.

# How to use the code

## API

The APIs presented in this paper cover most of the functionality found in the Appointment Management menu option. They follow a consistent calling convention that allows for returning rich error messages from the called routines, making them suitable as an interface to be used by external applications.

## Assumed Variables

The only assumed variables used in this API are Kernel variables documented in section 2.3.1.3.2 of the SAC. In this version the following assumed variables were used: DUZ,DT,U

## Format and conventions of the calls

The conventions used in this API are very similar to those enforced by the RPC Broker. Every tag has at least one parameter, passed by reference that will hold the result of the call. Every function returns a Boolean to signal if the processing was successful or not.

If the return value is 0, the first parameter (RETURN) will be structured as an array containing the errors encountered, numbered from 0 to the error count. The errors have the following form:

ErrorId^Message

Example

INVPARAM^Invalid parameter value – SDWLDFN

# Installation

Along with this paper a KID Host File is provided. The steps required to install the distribution are outlined below:

1. From the *Systems Manager Menu* select *Programmer Options…*
2. Select *Kernel Installation & Distribution System*
3. Select *Installation*
4. Select *Load a Distribution*
5. Enter the host file path, for example C:\ SD\_5.3\_260003.KID and load the distribution.
6. Use the *Install Package(s)* option and select SD\*5.3\*260003
7. When prompted *Want KIDS to Rebuild Menu Trees Upon Completion of Install?* Respond NO
8. When prompted *Want KIDS to INHIBIT LOGONs during the install?* Respond NO
9. When prompted *Want to DISABLE Scheduled Options, Menu Options, and Protocols?* Respond NO

# Conclusions

This paper presented a set of APIs developed as part of the Open Source HER refactoring effort. They are meant to be used by both scroll & roll interface and RPC tags and to be accessible by other packages and applications. Also they should remove direct global access, uncouple the business logic from the user interface elements and minimize code duplication.