Session 1: Problem, Objective, Analysis

Problem: User regrets posting incorrect Canadian payroll benefits to AP Bill. Found out two requirements. **#1** For consistency/reconciliation reason, cannot allow changes to be made to any bill posted from subsystems. **#2** Need to allow bill posted from subsystem to be voidable.

Objective: Make AP Bill voidable if posted from Benefit inside Payroll subsystem.

Analysis: In order to make AP bill from subsystem voidable we need to create a batch number that can tie each bill to those source records inside the respective subsystem(s). Let's trace the data and learn from what's works.

1. In G/L Monthend CheckList we can find Batch Postings in Webrules;
2. Review sample s.proc RCAp.dbo.MkApPosting;

```
BEGIN TRANSACTION
…
SELECT @ThisBatchNo = LastBatchNo + 1 FROM RCGls.dbo.GlBatchInfo WHERE CompanyId =
@CompanyId
IF @@ERROR <> 0 OR @@ROWCOUNT <> 1 BEGIN RAISERROR ('|%s|{5}',18,2,@sys) WITH
SETERROR RETURN 1 END        -- Cannot find batch number.
…
UPDATE RCGls.dbo.GlBatchInfo SET LastBatchNo = @ThisBatchNo WHERE CompanyId =
@CompanyId
COMMIT TRANSACTION
```

3. Check structure of RCGls.dbo.GlBatchInfo;
4. Learnt that before being used, GlBatchInfo is initialized by s.proc WrGetMaxMnId called by a web rule within GL checklist;

```
IF NOT EXISTS (SELECT 1 FROM dbo.GlBatchInfo where CompanyId = @NCompanyId)
BEGIN
        INSERT INTO dbo.GlBatchInfo (LastBatchNo,CompanyId)
        SELECT 0,@NCompanyId
END
```

5. GlBatchInfo can handle many subsystems posting to GL;
6. Hypothetically if we create ApBatchInfo, it should also be able to handle many subsystems posting to AP Bill;
7. The only difference is, posting to GL is initiated from GL (**pull**) whereas posting to AP is initiated from the subsystems (**push**);
8. Easiest way to get around this: <mark>instead of throwing an error when BatchNo cannot be found, add a row to GlBatchInfo from each subsystem when not found.</mark>

Now learn how a bill is not voidable from a constraint server rule "Cannot update once voided" s.proc CrNoBillUpdOncePosted. It involves BillType.

Good news. Upon reviewing how a bill is deemed voidable discovered that BillType table has a Voidable Y/N field so we can deal with one subsystem at a time. Need to watch out if the same subsystem such as Payroll subsystem has more than one type of posting to AP Bill ie BenefitDet and PayrollDtl but there is only one bill type; whereas Inventory subsystem also has more than one type of posting and it has two bill types.

Upon checking discovered that three (4) changes in CrNoBillUpdOncePosted are needed:

1. The following wordings "do not void any bill posted from other sub-systems" should be changed to "do not void any bill posted from selected sub-system(s)".
2. The following code should be enhanced from:

```
IF @Void = 'Y'
BEGIN
    IF EXISTS (SELECT 1 FROM dbo.Bill a INNER JOIN dbo.BillType b ON a.BillTypeCd =
    b.BillTypeCd AND a.BillId = @BillId AND b.Voidable = 'N')
    BEGIN
            RAISERROR('Please do not void any bill posted from other sub-
    systems.',18,2) WITH SETERROR
            RETURN 1
    END
```

to (declare @BillTypeDesc nvarchar(50))

```
    IF EXISTS (SELECT @BillTypeDesc = b.BillTypeDesc FROM dbo.Bill a INNER JOIN
    dbo.BillType b ON a.BillTypeCd = b.BillTypeCd AND a.BillId = @BillId AND
    b.Voidable = 'N')
    BEGIN
            RAISERROR('Please do not void any bill posted from sub-system %s.',18,2,
    @BillTypeDesc) WITH SETERROR
            RETURN 1
    END
END
```

3. Before the above void check, add the following to prevent changes ("NOT IN" is more flexible):

```
    IF EXISTS (SELECT 1 FROM dbo.Bill a INNER JOIN dbo.BillType b ON a.BillTypeCd
    = b.BillTypeCd AND a.BillId = @BillId AND b.BillTypeCd NOT IN
    ('A','D','F','R')
    BEGIN
            RAISERROR('Please do not change any bill posted from other sub-
    systems.',18,2) WITH SETERROR
            RETURN 1
    END
```

The following additional changes may do the job:

1. Add column BatchNo int not null default 0 to RCPCan.dbo.BenefitDet ! and RCPCan.dbo.PayrollDtl ?
2. In s.proc IrUpdBillInfo need to add the following code:

```
IF @Void = 'Y' AND getutcdate() >= '2023.03.01' and EXISTS (SELECT 1 FROM dbo.Bill
a INNER JOIN dbo.BillType b ON a.BillTypeCd = b.BillTypeCd AND a.BillId = @BillId
AND b.Voidable = 'Y')
BEGIN
        SELECT @BatchNo = CONVERT(int,BillRefNo) FROM dbo.Bill WHERE BillId =
        @BillId
        IF @BillTypeCd = 'P' AND EXISTS (SELECT 1 FROM master.dbo.sysdatabases
        WHERE name = 'RCPCan')
        BEGIN
                UPDATE RCPCan.dbo.BenefitDet SET Posted = 'N', BatchNo = 0 WHERE
        BatchNo = @BatchNo
                UPDATE RCPCan.dbo.PayrollDtl ??????
        END
END
```

3. Two problems here:
    a. Payroll now has RCPCan and RCPSgp; need to expand BillTypeCd to
        i. char(3) eg. P01, P02, … P99 etc.; OR
        ii. make it the same as SystemAbbr varchar(4) of RCDesign.dbo.Systems; The latter is no good because as mentioned earlier, Inventory subsystem posts three separate kinds of bills and they already have three different BillTypeCd; Therefore
        iii. should combine something like them together to introduce BCan, BSgp, etc. for BenefitDet; plus write a script to update BillType table once and for all.
    b. PayrollDtl has no "Posted" column; need to find a way to void other bills of the same batch or change the strategy to void from the source subsystem instead. The latter has the same issue as the former on BenefitDet because voiding one row would need to void other rows of the same batch. Better to do the former (void the other posting having the same batch number) – less work.

Session 2: Improved Design

Need to perform this exercise in two independent phases.

Phase I: Expand BillTypeCd to char(4), enhance BillTypeDesc, and split Payroll BillType into two.

1. Script all views, functions and procedures in all databases to find out where BillTypeCd is used.
2. On screen "Data Table and Column", change PK BillTypeCd of RCAp.dbo.BillType from char(1) to char(4);
3. After pushing the above change to database, add the following SQL to the change script in screen "Release Content":

```
EXEC ('TRUNCATE TABLE dbo.BillType)
EXEC ('INSERT dbo.BillType (''AGEN'',''GEN Adjustment'',1,5,''Y'')
EXEC ('INSERT dbo.BillType (''DGEN'',''GEN Debit Memo'',-1,5,''Y'')
EXEC ('INSERT dbo.BillType (''FGEN'',''GEN Finance Charge'',1,5,''Y'')
EXEC ('INSERT dbo.BillType (''RGEN'',''GEN Regular Bill'',1,5,''Y'')
EXEC ('INSERT dbo.BillType (''CAST'',''AST Asset Acquisition'',1,5,''N'')
EXEC ('INSERT dbo.BillType (''EXRS'',''XRS Expense Report'',1,3,''N'')
EXEC ('INSERT dbo.BillType (''IIVT'',''IVT Item Receipt'',1,5,''N'')
EXEC ('INSERT dbo.BillType (''OIVT'',''IVT Purchase Order'',1,5,''N'')
EXEC ('INSERT dbo.BillType (''SPER'',''PER Special Expense'',1,4,''N'')
EXEC ('INSERT dbo.BillType (''MCAN'',''CAN Remittance Canada'',1,5,''N'')
EXEC ('INSERT dbo.BillType (''PCAN'',''CAN Payroll Canada'',1,2,''N'')
EXEC ('INSERT dbo.BillType (''BCAN'',''CAN Benefit Canada'',1,5,''N'')
EXEC ('INSERT dbo.BillType (''MSGP'',''SGP Remittance Singapore'',1,5,''N'')
EXEC ('INSERT dbo.BillType (''PSGP'',''SGP Payroll Singapore'',1,2,''N'')
EXEC ('INSERT dbo.BillType (''BSGP'',''SGP Benefit Singapore'',1,5,''N'')
```

4. On screen "Data Table and Column", change BillTypeCd of RCAp.dbo.Bill from char(1) to char(4);
5. After pushing the above change to database, add the following SQL to the change script in screen "Release Content":

EXEC ('UPDATE dbo.Bill SET BillTypeCd = ''CAST'' WHERE LEFT(BillTypeCd,1) = ''C''')

EXEC ('UPDATE dbo.Bill SET BillTypeCd = ''EXRS'' WHERE LEFT(BillTypeCd,1) = ''E''')

EXEC ('UPDATE dbo.Bill SET BillTypeCd = ''IIVT'' WHERE LEFT(BillTypeCd,1) = ''I''')

EXEC ('UPDATE dbo.Bill SET BillTypeCd = ''OIVT'' WHERE LEFT(BillTypeCd,1) = ''O''')

EXEC ('UPDATE dbo.Bill SET BillTypeCd = ''SPER'' WHERE LEFT(BillTypeCd,1) = ''S''')

EXEC ('UPDATE dbo.Bill SET BillTypeCd = ''MSGP'' WHERE LEFT(BillTypeCd,1) = ''M'' AND EXISTS (SELECT 1 FROM RCCmon.dbo.Company WHERE BusinessNbr = ''201733209Z'')')

EXEC ('UPDATE dbo.Bill SET BillTypeCd = ''MCAN'' WHERE LEFT(BillTypeCd,1) = ''M'' AND NOT EXISTS (SELECT 1 FROM RCCmon.dbo.Company WHERE BusinessNbr = ''201733209Z'')')

EXEC ('UPDATE dbo.Bill SET BillTypeCd = ''BSGP'' WHERE LEFT(BillTypeCd,1) = ''P'' AND Memo like ''%benefit%'' AND EXISTS (SELECT 1 FROM RCCmon.dbo.Company WHERE BusinessNbr = ''201733209Z'')')

EXEC ('UPDATE dbo.Bill SET BillTypeCd = ''BCAN'' WHERE LEFT(BillTypeCd,1) = ''P'' AND Memo like ''%benefit%'' AND NOT EXISTS (SELECT 1 FROM RCCmon.dbo.Company WHERE BusinessNbr = ''201733209Z'')')

EXEC ('UPDATE dbo.Bill SET BillTypeCd = ''PSGP'' WHERE LEFT(BillTypeCd,1) = ''P'' AND Memo NOT like ''%benefit%'' AND EXISTS (SELECT 1 FROM RCCmon.dbo.Company WHERE BusinessNbr = ''201733209Z'')')

EXEC ('UPDATE dbo.Bill SET BillTypeCd = ''PCAN'' WHERE LEFT(BillTypeCd,1) = ''P'' AND Memo NOT like ''%benefit%'' AND NOT EXISTS (SELECT 1 FROM RCCmon.dbo.Company WHERE BusinessNbr = ''201733209Z'')')

EXEC ('UPDATE dbo.Bill SET BillTypeCd = LEFT(BillTypeCd,1) + ''GEN'' WHERE LEFT(BillTypeCd,1) IN (''A'',''D'',''F'',''R'')')

6. On screen "Data Table and Column", change BillTypeCd of RCAp.dbo.BillRcu from char(1) to char(4);

7. After pushing the above change to database, add the following SQL to the change script in screen "Release Content":

EXEC ('UPDATE dbo.BillRcu SET BillTypeCd = ''CAST'' WHERE LEFT(BillTypeCd,1) = ''C''')

EXEC ('UPDATE dbo.BillRcu SET BillTypeCd = ''EXRS'' WHERE LEFT(BillTypeCd,1) = ''E''')

EXEC ('UPDATE dbo.BillRcu SET BillTypeCd = ''IIVT'' WHERE LEFT(BillTypeCd,1) = ''I''')

EXEC ('UPDATE dbo.BillRcu SET BillTypeCd = ''OIVT'' WHERE LEFT(BillTypeCd,1) = ''O''')

EXEC ('UPDATE dbo.BillRcu SET BillTypeCd = ''SPER'' WHERE LEFT(BillTypeCd,1) = ''S''')

EXEC ('UPDATE dbo.BillRcu SET BillTypeCd = ''MSGP'' WHERE LEFT(BillTypeCd,1) = ''M'' AND EXISTS (SELECT 1 FROM RCCmon.dbo.Company WHERE BusinessNbr = ''201733209Z'')')

EXEC ('UPDATE dbo.BillRcu SET BillTypeCd = ''MCAN'' WHERE LEFT(BillTypeCd,1) = ''M'' AND NOT EXISTS (SELECT 1 FROM RCCmon.dbo.Company WHERE BusinessNbr = ''201733209Z'')')

EXEC ('UPDATE dbo.BillRcu SET BillTypeCd = ''BSGP'' WHERE LEFT(BillTypeCd,1) = ''P'' AND Memo like ''%benefit%'' AND EXISTS (SELECT 1 FROM RCCmon.dbo.Company WHERE BusinessNbr = ''201733209Z'')')

EXEC ('UPDATE dbo.BillRcu SET BillTypeCd = ''BCAN'' WHERE LEFT(BillTypeCd,1) = ''P'' AND Memo like ''%benefit%'' AND NOT EXISTS (SELECT 1 FROM RCCmon.dbo.Company WHERE BusinessNbr = ''201733209Z'')')

EXEC ('UPDATE dbo.BillRcu SET BillTypeCd = ''PSGP'' WHERE LEFT(BillTypeCd,1) = ''P'' AND Memo NOT like ''%benefit%'' AND EXISTS (SELECT 1 FROM RCCmon.dbo.Company WHERE BusinessNbr = ''201733209Z'')')

EXEC ('UPDATE dbo.BillRcu SET BillTypeCd = ''PCAN'' WHERE LEFT(BillTypeCd,1) = ''P'' AND Memo NOT like ''%benefit%'' AND NOT EXISTS (SELECT 1 FROM RCCmon.dbo.Company WHERE BusinessNbr = ''201733209Z'')')

EXEC ('UPDATE dbo.BillRcu SET BillTypeCd = LEFT(BillTypeCd,1) + ''GEN'' WHERE LEFT(BillTypeCd,1) IN (''A'',''D'',''F'',''R'')')

8. The following should also be replaced from:

```
CREATE PROCEDURE [dbo].[CrNoAddBillByType]
 @BillTypeCd  char(1)
/* WITH ENCRYPTION */
AS
SET NOCOUNT ON
/* It is ok to bill from Inventory and purcahse order */
IF @BillTypeCd NOT IN ('I','O') AND EXISTS (SELECT 'true' FROM dbo.BillType WHERE
BillTypeCd = @BillTypeCd AND Voidable = 'N')
BEGIN
```

```
        RAISERROR('This bill type is restricted to other subsystems; Please select
another type and try again.',18,2) WITH SETERROR
        RETURN 1
END
RETURN 0
```

to

```
ALTER PROCEDURE [dbo].[CrNoAddBillByType]
 @BillTypeCd  char(4)
/* WITH ENCRYPTION */
AS
SET NOCOUNT ON
/* It is ok to bill from Inventory and purchase order */
IF @BillTypeCd NOT IN ('IIVT','OIVT','AGEN','DGEN','FGEN','RGEN')
BEGIN
        RAISERROR('This bill type is restricted to other subsystems; Please select
another bill type and try again.',18,2) WITH SETERROR
        RETURN 1
END
RETURN 0
```

9. The following should also be replaced from:

```
CREATE PROCEDURE [dbo].[CrNoBillUpdOncePosted]
 @BillId        int
,@Void          char(1)
/* WITH ENCRYPTION */
AS
SET NOCOUNT ON
IF EXISTS (SELECT 1 FROM dbo.Bill WHERE BillId = @BillId AND (TrnsToGlDate is not
null OR VoidToGlDate is not null))
BEGIN
        RAISERROR('Cannot update bill once posted to G/L.',18,2) WITH SETERROR
        RETURN 1
END
IF @Void = 'Y'
BEGIN
        IF EXISTS (SELECT 1 FROM dbo.Bill a INNER JOIN dbo.BillType b ON
a.BillTypeCd = b.BillTypeCd AND a.BillId = @BillId AND b.Voidable = 'N')
        BEGIN
                RAISERROR('Please do not void any bill posted from other sub-
systems.',18,2) WITH SETERROR
                RETURN 1
        END
END
IF EXISTS (SELECT 1 FROM dbo.PmtApply a INNER JOIN dbo.Pmt b ON a.PmtId = b.PmtId
AND a.BillId = @BillId AND b.Void = 'N')
BEGIN
        RAISERROR('Please void the payment on this bill first before attempting to
change this bill.',18,2) WITH SETERROR
        RETURN 1
END
RETURN 0
```

to

```sql
ALTER PROCEDURE [dbo].[CrNoBillUpdOncePosted]
 @BillId        int
,@Void          char(1)
/* WITH ENCRYPTION */
AS
SET NOCOUNT ON
DECLARE @BillTypeDesc nvarchar(50)
IF EXISTS (SELECT 1 FROM dbo.Bill WHERE BillId = @BillId AND (TrnsToGlDate is not
null OR VoidToGlDate is not null))
BEGIN
        RAISERROR('Cannot update bill once posted to G/L.',18,2) WITH SETERROR
        RETURN 1
END
IF EXISTS (SELECT 1 FROM dbo.Bill a INNER JOIN dbo.BillType b ON a.BillTypeCd
= b.BillTypeCd AND a.BillId = @BillId AND b.BillTypeCd NOT IN
('AGEN','DGEN','FGEN','RGEN')
BEGIN
        RAISERROR('Please do not change any bill posted from other sub-
systems.',18,2) WITH SETERROR
        RETURN 1
END
IF @Void = 'Y'
BEGIN
        IF EXISTS (SELECT @BillTypeDesc = b.BillTypeDesc FROM dbo.Bill a INNER JOIN
dbo.BillType b ON a.BillTypeCd = b.BillTypeCd AND a.BillId = @BillId AND
b.Voidable = 'N')
        BEGIN
                RAISERROR('Please do not void any bill posted from selected sub-
system %s.',18,2,@BillTypeDesc) WITH SETERROR
                RETURN 1
        END
END
IF EXISTS (SELECT 1 FROM dbo.PmtApply a INNER JOIN dbo.Pmt b ON a.PmtId = b.PmtId
AND a.BillId = @BillId AND b.Void = 'N')
BEGIN
        RAISERROR('Please void the payment on this bill first before attempting to
change this bill.',18,2) WITH SETERROR
        RETURN 1
END
RETURN 0
```

10. The `@BillTypeCd char(1)` in `dbo.IrUpdBillInfo` should also be changed to char(4).
11. Also "`IF @BillTypeCd IN ('I','O') AND @VendorId is NULL`" should be changed to "`IF LEFT(@BillTypeCd,1) IN ('I','O') AND @VendorId is NULL`".
12. In dbo.IrUpdPmt,
    a. "`c.BillTypeCd = 'P'`" changed to "`LEFT(c.BillTypeCd,1) = 'P'`"
    b. "`c.BillTypeCd = 'E'`" changed to "`LEFT(c.BillTypeCd,1)c.BillTypeCd = 'E'`"
    c. "`c.BillTypeCd = 'S'`" changed to "`LEFT(c.BillTypeCd,1)c.BillTypeCd = 'S'`"
    d. "`BillTypeCd = 'R'`" changed to "`LEFT(c.BillTypeCd,1)c.BillTypeCd = 'R'`"
13. In dbo.MkApPosting, "`AND BillTypeCd = 'M'`" changed to "`AND LEFT(c.BillTypeCd,1) = 'M'`".

14. The @BillTypeCd char(1) in dbo. WrSetBillRecvPo should also be changed to char(4).
15. Also "IF @BillTypeCd IN ('I','O')" should be changed to "IF LEFT(@BillTypeCd,1) IN ('I','O')".
16. Also "IF @BillTypeCd = 'I'" changed to "IF LEFT(@BillTypeCd,1) = 'I'".

17. Similarly, all other databases having "BillTypeCd" in View, function, procedures should be changed accordingly.
18. Use VS to fish out webrules having "BillTypeCd" in it.

Phase II: Add BatchNo

1. Add column BatchNo int not null default 0 to RCPCan.dbo.BenefitDet and RCPCan.dbo.Payroll.
2. …to be continued.