

Oh, the Things You'll See!

Database Clean Up

Pre-Migration Cleanup

- Our database is dirty
- So is yours.
- The Visual Element Migrator can handle only so much dirt.
- We had to clean it up.

Problems

- Total Quantity = 0
- Percent in CS doesn't agree with quantity in CS
- Percents don't add up to 100%
- Quantities don't add up to Total Quantity
- There are Nulls in Percent and Quantity Fields
- There are percents and quantities in CS that don't exist (e.g. CS4 in a 3 CS element)

Which Database?

- “Clean up the data, but don’t touch it!”
- Don’t have to clean up the DB you are actually going to convert to BrM 5.1.3
- You can create a copy, clean it up, run the Migrator on that.
- Convert the still dirty original to BrM 5.1.3
- Then import the Migrator files made from the copy into the BrM 5.1.3 DB
- During import of the Migrator file, old data remains untouched in “old” tables, migrated data put in “new” tables
- You wind up with a DB with unadulterated old inspections and migrated inspections from a clean DB.

Migration

- After everything is set up, the migration itself is actually easy, as we saw in the last User Group meeting.
- The only complication I ran into was file size.

- The problem isn't in the migrator, it is in the import to BrM 5.1.3.
- If the file is too big, BrM can't finish before timing out during import (at least in the desktop version).
- The solution is you migrate your database in chunks, a few smaller files instead of one big one.
- Believe it or not, I can import multiple small files in less time than one big one.

- I had somewhat over 580,000 records to migrate.
- The Migrator handles them fine.
- BrM chokes on import.
- I knew from goofing around, 60,000 records go into BrM just fine.
- Rather than wasting a bunch of time trying to find out just how many records would go in before BrM timed out, I just chopped my table into 60,000 record chunks.

This is what my chunks look like

- `Bridge.BRKEY<='01C902895 00044'`
- `Bridge.BRKEY>'01C902895 00044' AND Bridge.BRKEY <='05C08 220300022'`
- `Bridge.BRKEY>'05C08 220300022' AND Bridge.BRKEY <='07T33 000000000'`
- `Bridge.BRKEY>'07T33 000000000' AND Bridge.BRKEY <='09500 066 03252'`
- `Bridge.BRKEY>'09500 066 03252' AND Bridge.BRKEY <='12C21 003 01940'`
- `Bridge.BRKEY>'12C21 003 01940' AND Bridge.BRKEY <='18499 009 03440'`
- `Bridge.BRKEY>'18499 009 03440' AND Bridge.BRKEY <='22C09 001101129'`
- `Bridge.BRKEY>'22C09 001101129' AND Bridge.BRKEY <='47C95 969 00000'`
- `Bridge.BRKEY>'47C95 969 00000'`

It was easy to just copy and paste these one by one into the Where clause of the Migrator's Settings tab, and migrate them individually

Edit Migrator Rules CoRe Elements AASHTO Elements Settings

Migrator Operating Settings

Data Extractor Options

Test Connect **Connection String** Provider=SQLLEDB, Data Source=XD748845; Initial Catalog= HPONTIS_Source;Trusted_Connection=yes; MultipleActiveResultSets=true;

Cutoff Date 1/1/1901 **WHERE:** Bridge.BRKEY<='01C902895 00044'

Transform Processing Options

Migrated Data Common Values

Additional Options

Settings Important Safety Tip

1. Uncheck Verbose to reduce log file size
2. Check Combine
 - Multiple CoRe can go to the same new AASHTO Element
 - If these exist on same structure unit, the Migrator creates duplicate AASHTO elements. Will cause blow up on import
 - Combine bundles all relevant CoRe elements into a single AASHTO element. No blow up.

Migrator Operating Settings

Data Extractor Options

Test Connect **Connection String** Provider=SQLOLEDB; Data Source=XD7400AF; Initial Catalog= HPONTIS_Source;Trusted_Connection=yes; MultipleActiveResultSets=true;

Cutoff Date 1/1/1901 **WHERE:**

Transform Processing Options

Migrated Data Common Values

BRKEY **UNIT** **INSPKEY** **ENVKEY** 1 **INSPDATE** 1/1/1901

Additional Options

Combine M M Scalers **Verbose**

File Settings

ELEMENT-DATA-XML-FILE-FI View Validate Select... C:\usr\Input\Sample-Pontis-CoreElementData.xml

OUTPUT-AASHTO-ELEMENTS-FC View Validate Select... C:\usr\Output\junk.xml

Convert Original Database to 5.1.3 Database

- No problems to report
- There is only one script to run, no matter what database you start from (4.3, 4.5, 5.103, 5.1.2, etc.).
- It worked for me. I started from 5.103.

Set Up Agency Elements in New 5.1.3 Database

Two ways set up agency elements

- Visual Element Migrator can automate this
- Do it by hand the way Nature intended

Element Spec Page

Pontis5 Cassini Browser

File Sites Help

PONTIS BRIDGE MANAGEMENT SYSTEM

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- Renumbr Brkey
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- Navigation & Field Security

Bridges Reports Admin Inspection Gateway

Elements

Element Filter: Not Filtered

	ID	Short Name
	12	Concrete Deck
	13	Prestress Deck
	15	Prestress/RC Top Flange
	16	RC Top Flange
	28	Steel Deck - Open Grid
	29	Steel Deck - Conc Fill Grid
	30	Steel Deck - Orthotropic

Create Element

Element Specifications

Element Rollup Key:

Element Key: 1

NBE:

Smart Flag:

Protective System:

Model:

Classifications

Category:

Material:

Type:

Condition State Definitions

12 - Concrete Deck

ID	State Short	State Description
	Good	Cracking (Hairli

MR&R Action Definitions

Good - Cracking (Hairli

ID	Short Name
	Good - Cracking (Hairli

- We experimented with BrM 5.1.2 and 5.1.3 for a number of months trying to get a good feel for what we were going to do.

By the time we were ready, we had a practice 5.1.3 DB set up with our Agency Elements

Why not just export these elements from the practice to the new DB?



PONTIS BRIDGE MANAGEMENT SYSTEM

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- Cost Index
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Bridges Reports Admin Inspection Gateway

Export Options

Export Data: <07> Custom Table List

Sequence	Table Name	Include
1	BRIDGE	<input type="checkbox"/>
2	USERBRDG	<input type="checkbox"/>
3	STRUCTURE_UNIT	<input type="checkbox"/>
4	USERSTRUNIT	<input type="checkbox"/>
5	ROADWAY	<input type="checkbox"/>
6	USERRWAY	<input type="checkbox"/>
7	INSPEVNT	<input type="checkbox"/>
8	ELCATDFS	<input checked="" type="checkbox"/>
9	ELTYPDFS	<input checked="" type="checkbox"/>
10	MATDEFS	<input checked="" type="checkbox"/>
11	PON_ELEM_DEFS	<input checked="" type="checkbox"/>
12	PON_STATE_DEFS	<input checked="" type="checkbox"/>
13	PON_MRR_ACTION_DEFS	<input checked="" type="checkbox"/>

Add Table ACTMODLS



PONTIS BRIDGE MANAGEMENT SYSTEM

Menu

- Export**
- Import**
- Check Out**
- Check In**
- Override**

Bridges Reports Admin Inspection Gateway

Export what? Extensible Markup Language File (XML) ▼

Include: <07> Custom Table List ▼

Export which bridges?

Selected Bridges

All Bridges in the Database

Export

Complication

- We set up our elements following a draft of the AASHTO manual adopted in June.
- Defect flags are quite a bit different than original manual.
- New BrM 5.1.3 DB is set up on old manual
- Custom Import will not delete items that are not in it.
- Therefore, we had to delete the old defect flags by hand in BrM 5.1.3.

Import Files from Migrator into New Database

- Ok, I've got my migrated element files from the Migrator and my new database is set up with my Agency elements.
- It's show time!



PONTIS BRIDGE MANAGEMENT SYSTEM

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[Override](#)

[Bridges](#) [Reports](#) [Admin](#) [Inspection](#) [Gateway](#)

Import what?

Input File:
NBI File
XML File

Select

Options

Update Or

Create New Inspections Metric English

Import

Import what? AASHTO Migrated Element Inspection XML

Input File:

Select

Options

- Update Only
- Create New

Import

Open [?] [X]

Look in: Rules6

- 1_Rz6_LTEQ01C902.xml
- 2_Rz6_01C902to05C08.xml
- 3_Rz6_05C08to07T33.xml
- 4_Rz6_07T33to09500.xml
- 5_Rz6_09500to12C21.xml
- 6_Rz6_12C21to18499.xml
- 7_Rz6_18499to22C09.xml
- 8_Rz6_22C09to47C95.xml
- 9_Rz6_GT47C95.xml

File name: []

Files of type: *.pdj; *.nbi; *.xml; *.zip

Open Cancel

Import what? AASHTO Migrated Element Inspection XML

Input File: 1_Rz6_LTEQ01C902.xml x Cancel

Options

Update Only

Create New Inspections

Import UOM
 Metric English

Import

Import what? AASHTO Migrated Element Inspection XML ▾

Input File: ● 1_Rz6_LTEQ01C902.xml × Remove

Options

Update Only

Create New Inspections

Import UOM

Metric English

Import

Import what? AASHTO Migrated Element Inspection XML

Input File: 2_Rz6_01C902to05C08.xml Remove

Options

Update Only

Create New Inspections

Import UDTA
 Metric English

Import

Import file copied to server successfully.
The AASHTOInspXML run succeeded.



Import request being processed. Please wait.....



PONTIS BRIDGE MANAGEMENT SYSTEM

Menu

- Export
- Import**
- Check Out
- Check In
- Override

Bridges Reports Admin Inspection Gateway

Import what? AASHTO Migrated Element Inspection XML

Input File: Select

Options

Update Only Import UOM

Create New Inspections Metric English

Import

Import file copied to server successfully.
The AASHTOInspXML run succeeded.

Rinse, repeat

Migrating Element Notes

- I've migrated my elements, looks like I'm done!
- However, close inspection reveals the Element notes fields didn't make it
- TAG complained about this, it was outside of the scope for the migrator.

- Of course, the notes are still available with the old elements, visible to inspectors in BrM 5.1.3.
- They can read them. If they wish they can always cut and paste them into the migrated elements.
- The inspectors are team players, they always are willing to step up to the plate! Let's poll a few!





Maybe not.

- When you first consider the problem of migrating notes, it seems to be a question of just writing an update query to take care of it
- Unfortunately, migration is a bit more complex than that.
- There are 3 cases that need different treatment

1. There is a 1:1 relationship between old and new elements and the element number doesn't change. Example: RC girder 110 to RC Girder 110.
2. There is a 1:1 relationship between old and new elements and the element number does change. Example: Other Abutment 217 to Other Abutment 218.
3. There is not a 1:1 relationship between old and new elements. Two or more old elements are related to 1 new element. Example: Painted Steel Girder 107 and Unpainted Steel Girder 106 to Steel Girder 107.

- Case 1 and 2 are handled by simple and straightforward update queries.
- In case 1, one update query can handle all elements at once.
- In case 2, one update query is needed for each Core-AASHTO element pair.

- Case 3 is the potential nightmare
- If you have two Core elements on the same Structure Unit that convert to the same AASHTO element, to do it right, you need to put the notes from two fields into one.
- If this situation never arises, you can use the methods of Case 1 and 2.

- What's the worst that could happen using Case 1 and 2 for Case 3?
- Your query will in effect bring over only one note for each AASHTO Element involved, no matter how many CoRe elements were combined into it.
- This is because it will copy the note from the first CoRe Element, overwrite it with that of the second, overwrite that with the third, etc.

- Example, you have CoRe 106 unpainted girder and CoRe 107 painted girder on the same structure unit (it can happen).
- Query hits CoRe106 first, writes 106 note to AASHTO 107.
- Query then hits CoRe 107, writes 107 note to AASHTO 107, overwriting CoRe106 note.
- Perhaps this is rare enough you can live with it.

- If you use SQL Server (don't know about Oracle) and you can't live with it, life gets interesting.
- There are at least 5 ways to combine notes fields, none of them simple or straightforward.
- <https://www.simple-talk.com/sql/t-sql-programming/concatenating-row-values-in-transact-sql/>

- I just picked one that looked like it used the least amount of code and then bludgeoned it until it worked.
- Write the queries, run them, notes are migrated.

- Inspectors' irritation level declines.
- We're done, right?
- Not if you use Work Candidates!

Important Safety Tip

- In Pontis 4.X work screen, there was an innocuous item called Work Candidate ID. It pointed at a field into which you could put anything.
- The field has been removed in 5.1.3, but the Work Candidate ID item has not. It now points at the new work table's key field.

- This key is the only link between the “converted” work items in the new work table and the work items in the old work table, which they came from.
- Change it, and you break the link. You may not care.

- The key **MUST** be a unique value.
- Try to put in a value that is duplicated on any other work item, you get tossed out of BrM.
- Best not to mess with this.

Pontis 4.X

Pontis 4.4.4 Hot Fix - You are currently logged in as HWYE91F

Bridge Inspection Mode: Edit Type: Regular NBI Key: IYGE

Bridge: 00123K Find... Inspections (9) 09/14/20

1 CONDITION 2 NOTES 3 WORK 4 APPRAISAL 5 INVENTORY 6 ODOT

Work Candidate ID	Scope	Work	Da
1018-77747	Paint Stl Opn Girde	Other EL	10/
1018-77742	R/Conc Abutment	Other EL	10/

Select Type of Work: Element

Type of Work: ~~Element~~

Candidate ID: 1018-77747 Estimated Quant

Structure Unit: 1 / Type=M

Element: 107 - Paint Stl Opn Girder Estimated Cost:

Action: 48 - Other EL \$2

Priority: 2 - Routine/Schedule Applicable Condi

Harmless

BrM 5.1.3

BOOM!

1018-77745 995525

Type of Work

Candidate ID: 1018-77738

Structure Unit: 1 / Type = M

Action: 995255 - 300 Patch Header

Priority: Routine/Schedule

Date Recommended: 10/6/2003

Date Completed:

Target Year: 2004

Assigned:

Work Assignment: Salem Bridge Crew

Status: Completed

us: New Review Needed Approved By: HWYE93R

Change Candidate ID to "Read Only" immediately!!!!

Work Candidate Problem

The (invisible) Elephant

- Do you use the Work screen to generate inspector work items (work candidates)?
- BIG changes=BIG problems

Pontis 4.X

BrM 5.1.3

Pontis 4.4.4 Hot Fix - You are currently logged in as HWYE91F
File View Tools Window Help

Bridge Inspection Mode: Edit Type: Regular NBI Key: IYGE

Bridge: 00123K Find... Inspections (9) 09/14/20

1 CONDITION 2 NOTES 3 WORK 4 APPRAISAL 5 INVENTORY 6 ODOT

Work Candidate ID	Scope	Work	Da
1018-77747	Paint Stl Opn Girde	Other EL	10/
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Select Type of Work: Element

Type of Work: Element

Candidate ID: 1018-77747 Estimated Quant

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1018-77745 995525

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Status: Completed

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- New table, PON_INSP_WORKCAND replaces INSP_WCAND. Table structures, contents are very different,
- New philosophy, no more Bridge, Element or Flex actions. Now only Actions.
- So now we need to come up with new actions and we also need to convert the old actions to our new actions

Why aren't they converted for us?

- Old flex actions and MR&R actions were very flexible, an Agency could do about whatever it wanted.
- New Actions are very flexible. an Agency can do about whatever it wants.

- Not a lot of structure here.
- If you can't know what actions an Agency has nor what actions they are going to want to change them to, how do you convert them?
- You can't. The Agency will have to.

So, Whadaya Get?

- Actions, out of the box, are the same as old out of the box flex actions. This is all you get!

FLEX_ACTION_KEY	FLEX_ACT_NAME_SHORT
-1	Converted Work Candidates
0	Do nothing (flex)
1	Replace Super (flex)
10	Cathod. Prot. (flex)
2	Replace Deck (flex)
3	Replace Sub (flex)
4	Rehab Super (flex)
5	Rehab Deck (flex)
6	Rehab Sub (flex)
7	Paint Bridge (flex)
8	Spot Paint (flex)
9	Bridge Rehab (flex)

- Currently, work is being done on constructing a new list of Actions.
- These will come with BrM 5.2.1.
- For now, you are on your own.

Existing “Conversion”

Old Actions are copied to the new Work table during DB conversion

- ALL actions come over as -1 Converted Work Candidates

Action	Date Recommended	Target Year	Estimated Cost	Status	Work Assignment	Priority	Structure Unit	Date Completed	Description	
-1	10/6/2003	2004	\$5,000.00	Completed	4	Low	1 / Type = M		Converted Work Candidates	
-1	10/6/2003	2004	\$2,500.00	Completed	4	Low	1 / Type = M		Converted Work Candidates	
-1	10/6/2003	2004	\$250.00	Completed	4	Low	1 / Type = M		Converted Work Candidates	
-1	10/6/2003	2004	\$150.00	Completed	4	Low	1 / Type = M		Converted Work Candidates	
-1	10/6/2003	2004	\$1,000.00	Unknown	4	Low	1 / Type = M		Converted Work Candidates	
-1	10/6/2003	2004	\$2,000.00	Unknown	4	Low	1 / Type = M		Converted Work Candidates	

Elephant

Two big jobs on top of migrate elements!

1. Create new action list
2. Convert existing actions

Create New Action List

- We put ours together from different sources, lots of input
- You could get a start by stealing the new default list, your friendly, neighborhood TRT representative can probably get you a copy.

Order of Actions

- Do you want your actions to appear in a particular order?
- If not, no problem
- If so, getting your actions into the database is tricky.

- Actions live in `PON_FLEXACTIONS_SETS` and are sorted by the table key. (a Sort By column will be added in BrM 5.2)
- Key is varchar field. Even though number input is needed, it is sorted as text. So you get 0,1,10,100,11,12... The order you enter your actions in won't be the order they are displayed.

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Bridges Reports Admin Inspection Gateway

Flexible Actions

Key	Name	Description	Notes
-1	Converted Work Candidate	Converted Work Candidates	Converted Work Candidates
0	Do nothing (flex)	Bridge deteriorates according to the TP matrix	-1
1	Replace Super (flex)	Replace Superstructure	-1
10	Cathod. Prot. (flex)	Add Cathodic Protection	
2	Replace Deck (flex)	Replace Deck	-1
3	Replace Sub (flex)	Replace Substructure	-1
4	Rehab Super (flex)	Rehab Superstructure	-1
5	Rehab Deck (flex)	Rehab Deck	-1
6	Rehab Sub (flex)	Rehab Substructure	-1

Name	Description	Notes
<input type="text"/>	<input type="text"/>	<input type="text"/>

- I dealt with the order problem by beginning my list with key number 990000. Two advantages
 1. No more worries about order. 990010 comes after 990009, not 990001. So no more 0,1,10,11 problem. I can set up my key numbers more easily.
 2. BrM 5.2 will add default actions. They will have to add at least 991 new default actions before they start stomping on my list. Unlikely.

- Of course, I couldn't start with 990,000 in BrM manually.
- However, that gave me another advantage.
- Manually, you are stuck with autonumber sequence, i.e. if your highest key number is 20, the next key number will be 21.
- By doing this outside of BrM, I can leave space between my keys (e.g. 5, 10, 15). This gives me room to add actions between existing actions at a later date, if I need to.

- Adding actions outside of BrM is easy in SQL Server Management Studio.
- Construct the actions/keys in Excel spreadsheet set up with the same columns as PON_FLEXACTIONS_SETS
- There's a little bit of added work to get the other columns besides actions/keys populated, but not much.
- Use SQL Management Server to import spreadsheet into PON_FLEXACTIONS_SETS
- You're done. Actions are in!

Convert Existing Actions

- So what do you do with all the -1 Converted Work Candidate items?
- This is a major problem Two possible methods
 1. Manual Conversion
 2. Automated Conversion

Manual

- Very labor-time intensive, must look at every work item
- Use work notes field to decide which new action this action should be, select new action by hand

Automate

- Can link old work table and new work table through their keys, so you know which old action is which new action.
- There's information in the old table you may be able to use to determine which new action it is .

- Four fields in the old table describe old action: objkind, objcode, actkind, actcode. What these values mean vary depending on action (Bridge, Flex, Element)
- We used exclusively Element level Actions
- This simplified things for us,
objcode=element number
actcode=action type

- A further help was that we had cleaned up our MR&R actions a few years ago. Now, an action type refers to one and only one MR&R action per element.
- So, for us, given an element,
action type=MR&R action.

- I constructed a list of my MR&R actions in Excel including element and action type

ELEMKEY	ELEMSHORT	TKEY	ACTSHORT	ACTLONG
12	Bare Concrete Deck	0	Do Nothing	Do Nothing
12	Bare Concrete Deck	31	Replace	Replace the deck
12	Bare Concrete Deck	33	Rehab Deck	Rehabilitate the deck
12	Bare Concrete Deck	40	Protect	Add a protective system
12	Bare Concrete Deck	41	Repair	Repair spalls/delaminations
12	Bare Concrete Deck	48	Other_	Element Other

- I had a list of new Actions and keys, so I was set to map the old actions to the new
- All I did was to go down row by row of the old actions (excluding Do Nothing actions), decide which new action fit, and copied the new action key (and name) and pasted it in that row. We've got about 400 MR&R actions. Took between 2 and 3 days.

A	B	C	D	E	F	G
ELEMKEY	ELEMSHORT	TKEY	ACTSHORT	ACTLONG	Action	Key
12	Bare Concrete Deck	31	Replace	Replace the deck	12 Replace	990115

- A-E are from the old action, F is new Action Name, G is new Action Key
- Everything needed to write update query is here
- Objcode=Column A
- Actcode=Column C
- New Action Key (FLEX_ACT_KEY)=Column G

- I wrote concatenation to build the update query. It's all boilerplate except for bolded items, and they are cell references.
- =CONCATENATE("Update PON_INSP_WORKCAND SET FLEX_ACTION_KEY= ", **G2**, " FROM PON_INSP_WORKCAND, INSP_WCAND WHERE PON_INSP_WORKCAND.IWC_WORKCAND_ID = INSP_WCAND.WCKEY AND INSP_WCAND.OBJCODE = ", **A2**, " AND INSP_WCAND.ACTCODE= ", **C2**, "", CHAR(10), "GO")

- Once I had the concatenation written for the first row, it was simple just to copy it down over all the remaining rows.
- I now had update queries for my old actions.
- All that I needed to do was copy them into SQL Management Studio and run them, Except.....

- I'm not the DBA on this database.
- A key change is necessary, and a foreign key relationship has been defined that won't allow updates on the key.
- It's easy to fix, but usually only DBAs have permissions to make these changes.
- So, you likely will need a DBA to run these queries for you. Make sure to warn him about the relationship change, and make sure he changes it back after he is done.
- You're ready to roll! Yep, that's it! You now have a working 5.1.3 DB!

Addenda

Reports

- Elements for new inspections are in a different table than those for old inspections
- Ditto for work items
- Any custom reports you have for elements or work are pointed at the old tables.
- Bummer, dude.

Local Agencies

- We will drag local agencies into the new AASHTO element fold
- Just not now.
- Will coincide with the beginning of the new contracts next summer

- Local Agencies are currently doing their inspections in Pontis 4.4.
- Pontis 4.4 will run on BrM 5.1.3 database.
- Local Agencies are recording CoRe element inspections on same database as our inspectors are inputting new AASHTO element inspections.

- This means next summer I get to migrate all the inspections and work items the local agencies have input since the BrM 5.1.3 rollout.
- My expenditure on lottery tickets has increased.

Advice

- ACT NOW!!!!!!
- Start building a working 5.1.3 system set up the way you want in a test environment.
- This will help you to discover all the little surprises that will be specific to your Agency .
- Do this even if you are convinced you'll wait for BrM 5.2 to be released. You'll need to know at least 95% of what you will learn with BrM 5.1.3.
- You can't get ready overnight, so START NOW!

- Remember, this will all be on the Final!!