ibi Summit 2026

The Many Faces Of JOIN

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Session Agenda

- **What is a JOIN?**
- **JOIN Types**
- **Instance Types**
- **Short Paths**
- **FOCUS JOIN types**
  - Equality Based
  - DEFINE Based
  - WHERE Based
- **FOCUS vs SQL JOIN**



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Information Builders

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When your report requires data from many different sources...

- Employee Data
- Department Data
- Job Data
- Customer Data
- Invoices
- Product Data
- Support Data
- Purchase Orders
- Inventory Data



...you need JOIN, MATCH or MORE to make the connections!

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Each connection involves many choices:

Equal Fields or Conditions

Match exact field values or define complex conditional rules.

Real Fields or Virtual Fields

Join on physical database columns or dynamically computed fields.

One-to-One or One-to-Many

Determine the structural cardinality of your connected sources.

FOCUS or Interface Managed

Control joins natively or let external engine interfaces manage it.

Same or Different File Types

Connect identical table structures or merge completely different file formats.

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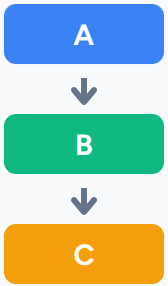
Common Join Configurations

Simple Join



Directly associates Table A with Table B using a matching key. This is the most fundamental and standard join configuration.

Chain Join



Connects Table A to B, and B to C in a linear sequence. Perfect for cascading or normalized multi-level relationships.

Forked Join

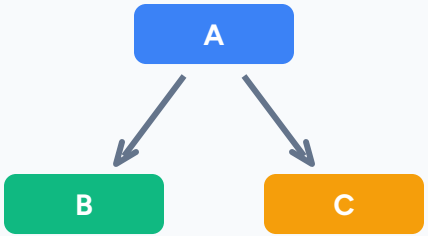


Table A acts as the driver, branching out to join Table B and Table C independently. Ideal for star-schema reporting designs.

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JOIN treats multiple structures as one

Conditional Connections

Connects separate data sources dynamically based on matching fields or complex conditional rules.

Horizontal Concatenation

Creates a clean horizontal concatenation, merging database columns into a single unified structure.

1,023

Active JOINS

The maximum number of active joins allowed simultaneously in a single session.

1,024

Max Segments

The absolute limit of data segments supported within a unified joined structure.

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Schema Definition: empdataq

```
FILENAME=EMPDATAQ, SUFFIX=SQLMYSQL, $
SEGMENT=SEG01, SEGTYPE=S0, $
FIELDNAME=PIN, ALIAS=ID, USAGE=A9, ACTUAL=A9, $
FIELDNAME=LASTNAME, ALIAS=LN, USAGE=A15, ACTUAL=A15, $
FIELDNAME=FIRSTNAME, ALIAS=FN, USAGE=A10, ACTUAL=A10, $
FIELDNAME=MIDINITIAL, ALIAS=MI, USAGE=A1, ACTUAL=A1, $
FIELDNAME=DIV, ALIAS=CDIV, USAGE=A4, ACTUAL=A4, $
FIELDNAME=DEPT, ALIAS=CDEPT, USAGE=A20, ACTUAL=A20, $
FIELDNAME=JOBCLASS, ALIAS=CJCLAS, USAGE=A8, ACTUAL=A8, $
FIELDNAME=TITLE, ALIAS=CFUNC, USAGE=A20, ACTUAL=A20, $
FIELDNAME=SALARY, ALIAS=CSAL, USAGE=D12.2M, ACTUAL=D8, $
FIELDNAME=LASTNAME1, ALIAS=LN1, USAGE=A15, ACTUAL=A15, $
FIELDNAME=HIREDATE, ALIAS=HDAT, USAGE=YYMD, ACTUAL=DATE, $
```

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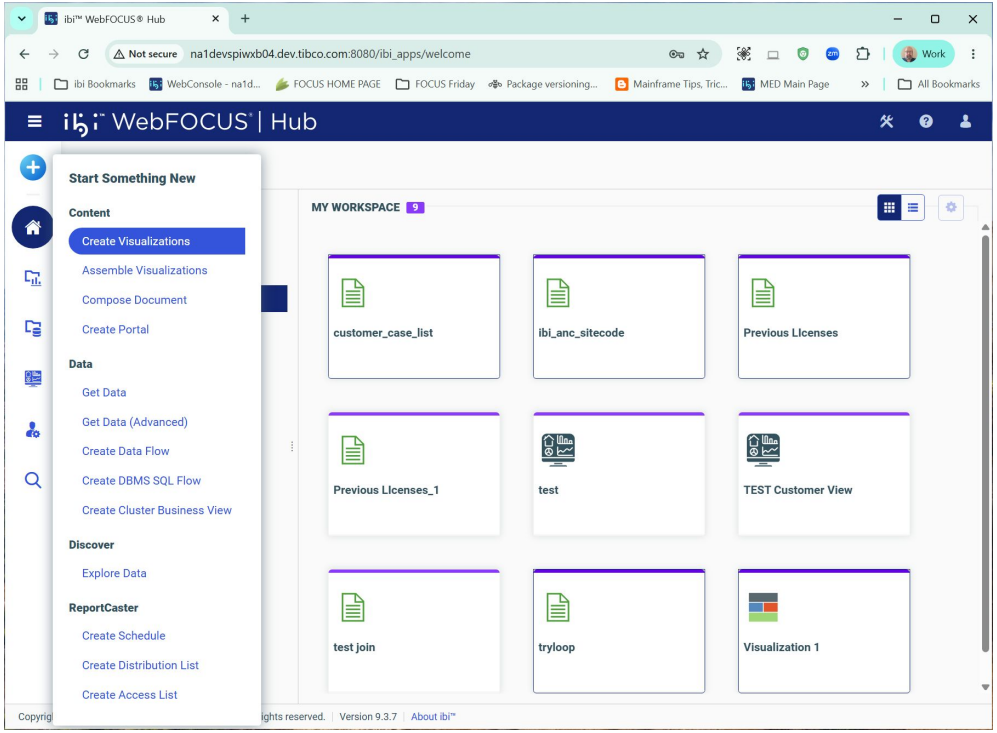
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Schema Definition: trainingq

```
FILENAME=TRAININGQ, SUFFIX=SQLMYSQL, $
SEGMENT=SEG01, SEGTYPE=S0, $
  FIELDNAME=PIN, ALIAS=ID, USAGE=A9, ACTUAL=A9, $
  FIELDNAME=COURSESTART, ALIAS=CSTART, USAGE=YYMD, ACTUAL=DATE, $
  FIELDNAME=COURSECODE, ALIAS=CCOD, USAGE=A7, ACTUAL=A7, $
  FIELDNAME=EXPENSES, ALIAS=COST, USAGE=D8.2, ACTUAL=D8,
    MISSING=ON, $
  FIELDNAME=GRADE, ALIAS=GRA, USAGE=A2, ACTUAL=A2,
    MISSING=ON, $
  FIELDNAME=LOCATION, ALIAS=LOC, USAGE=A6, ACTUAL=A6,
    MISSING=ON, $
```

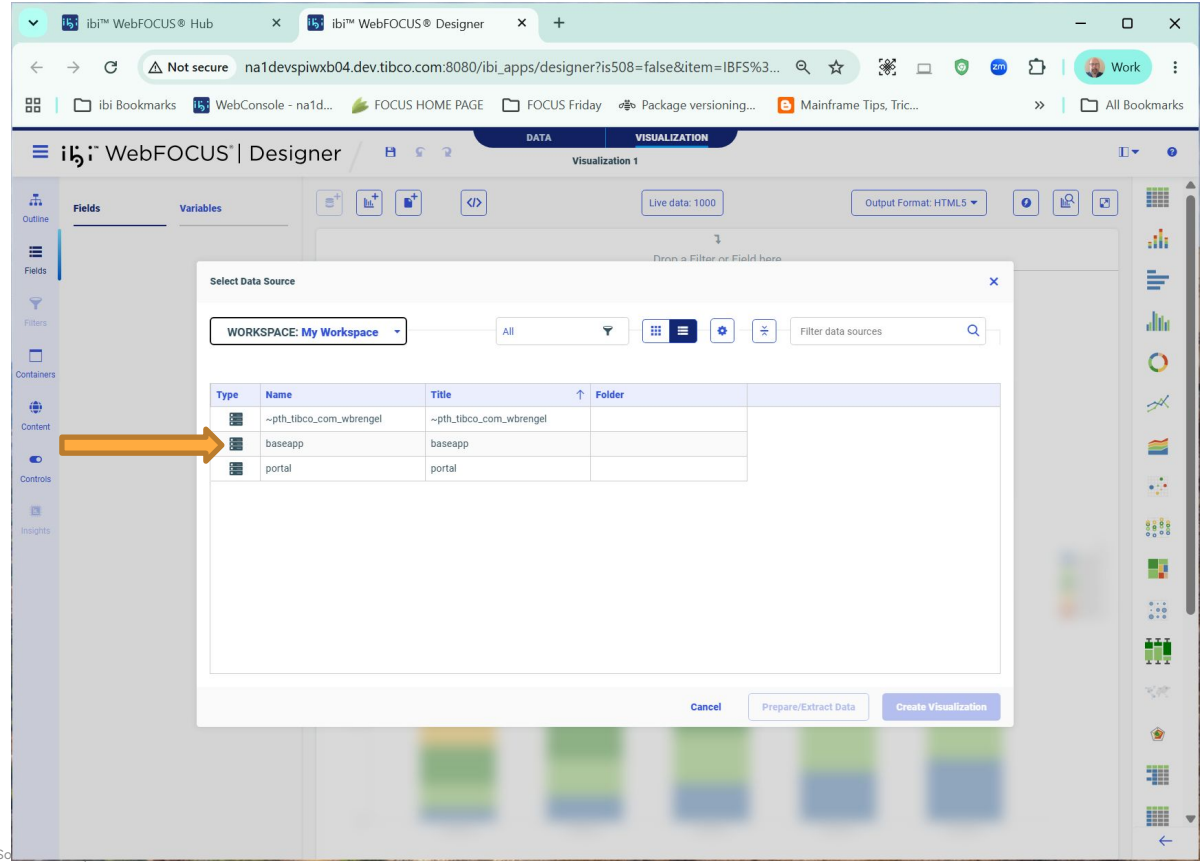
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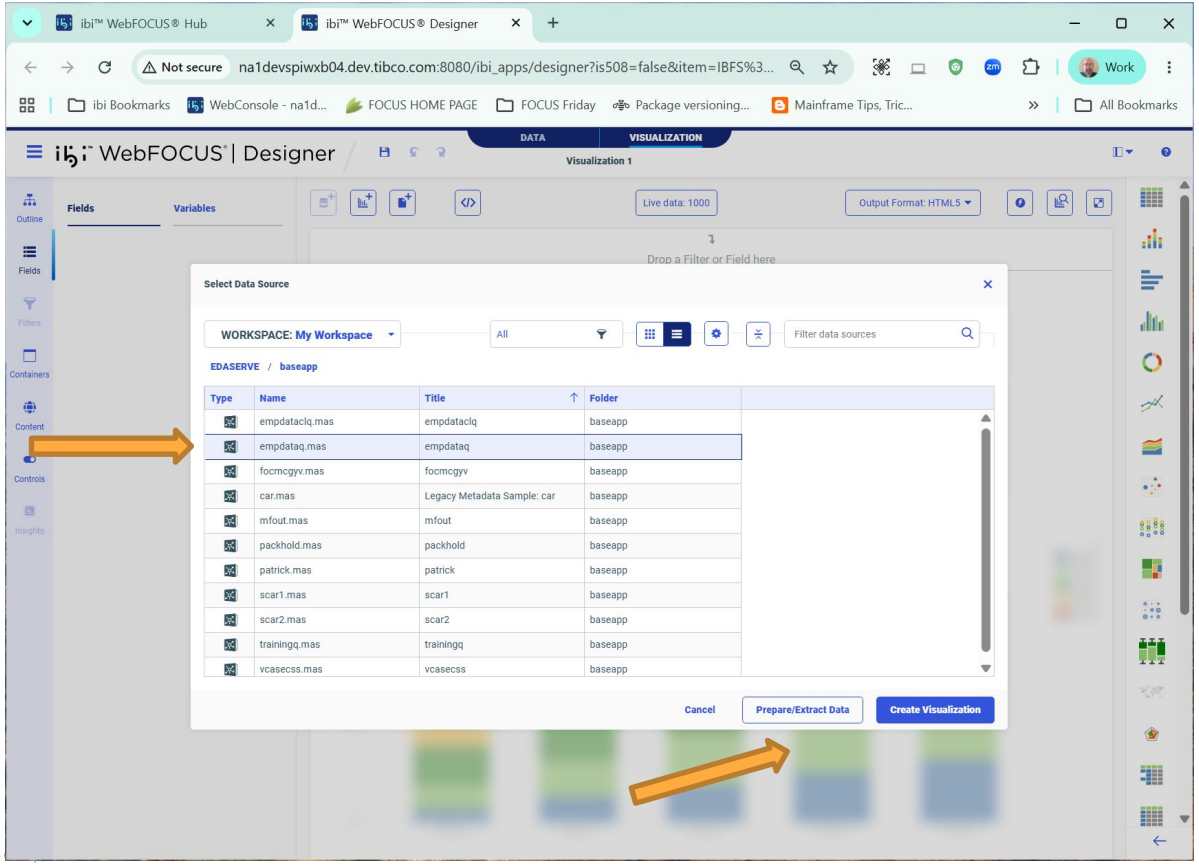
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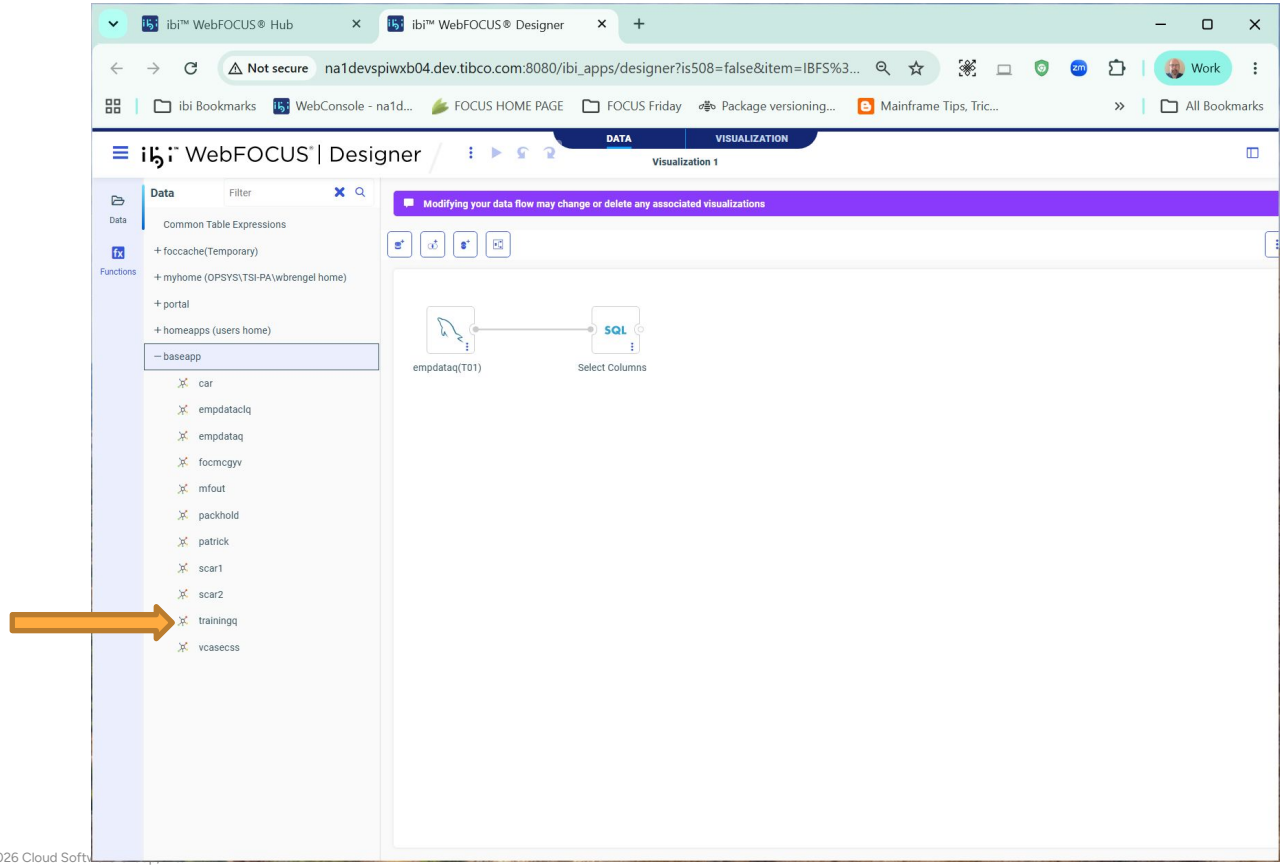
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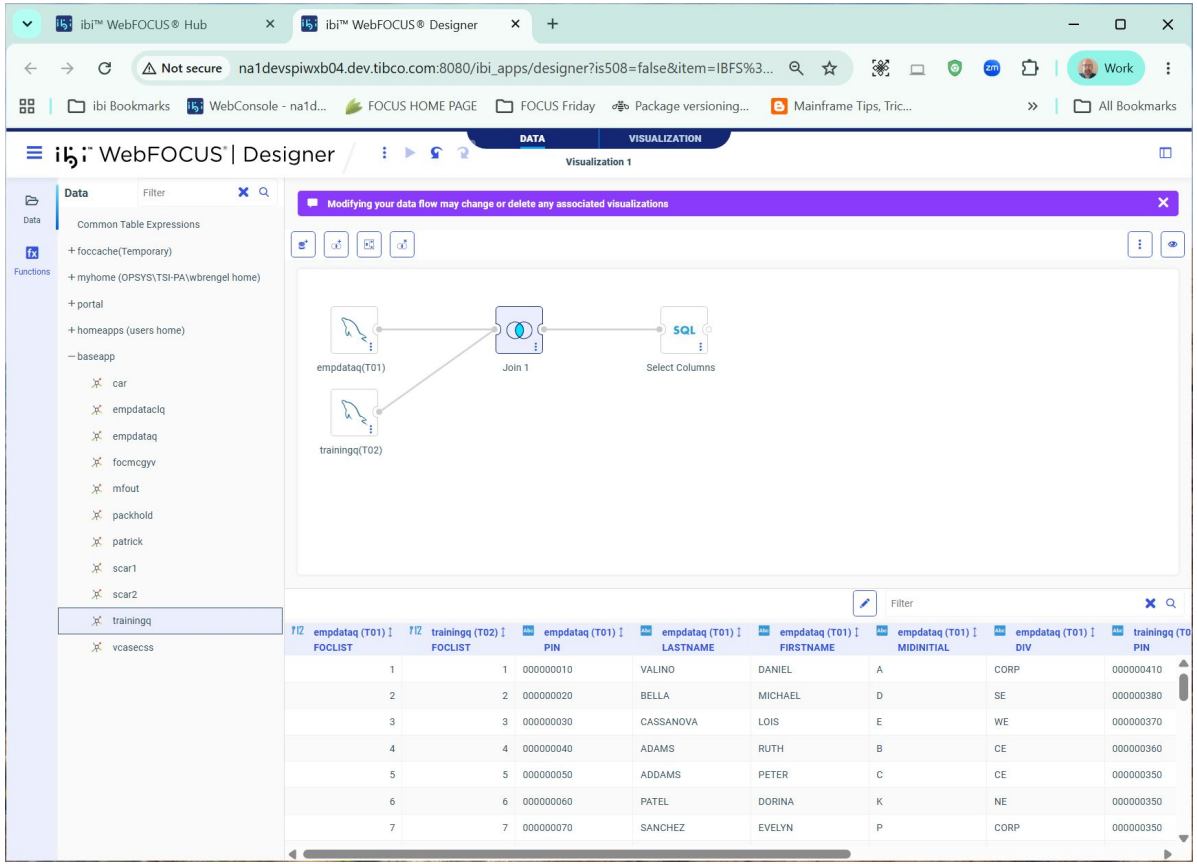
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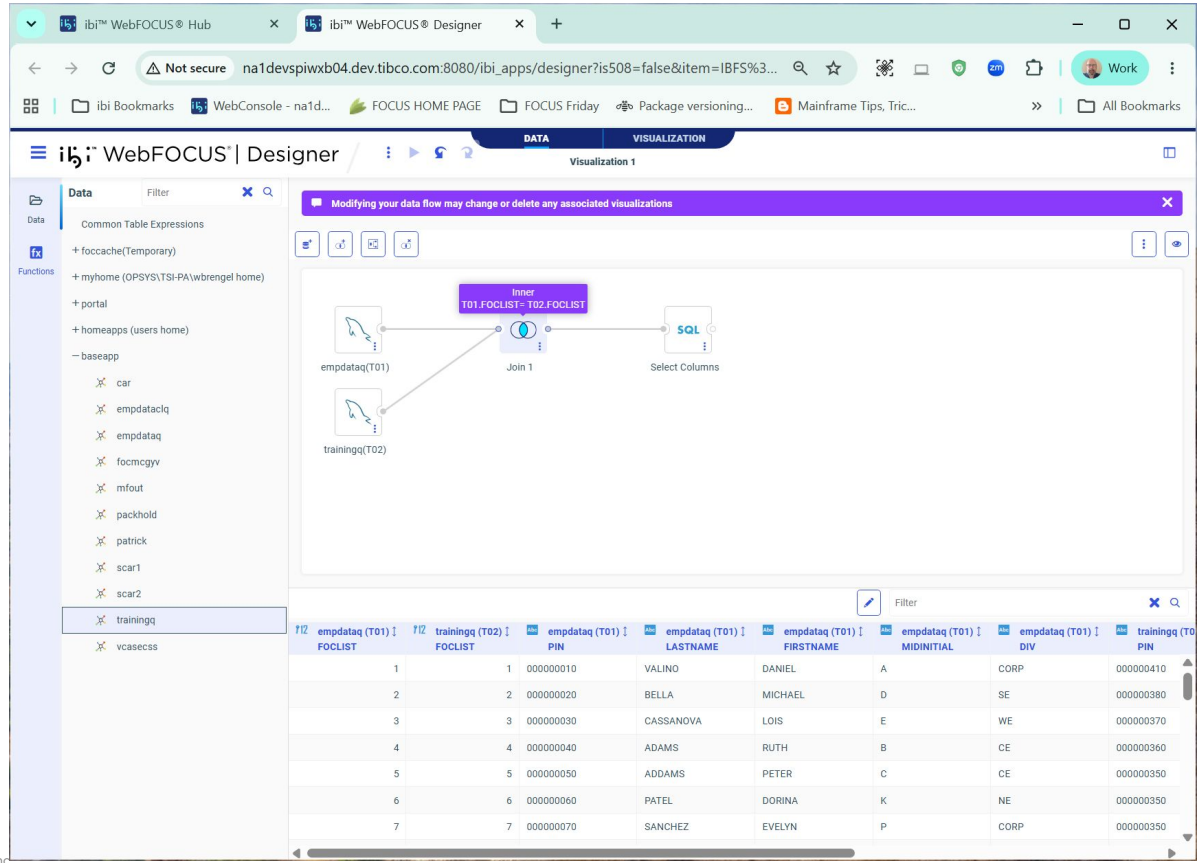
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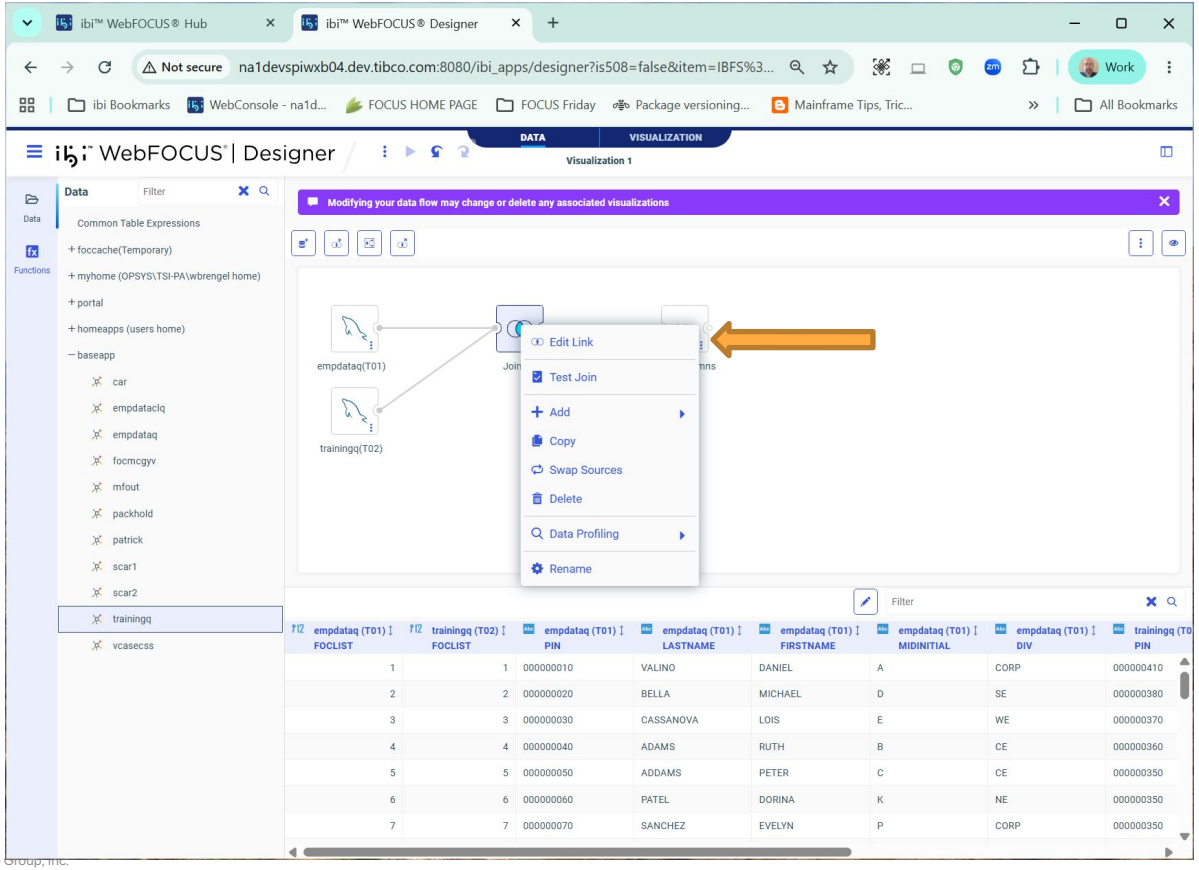
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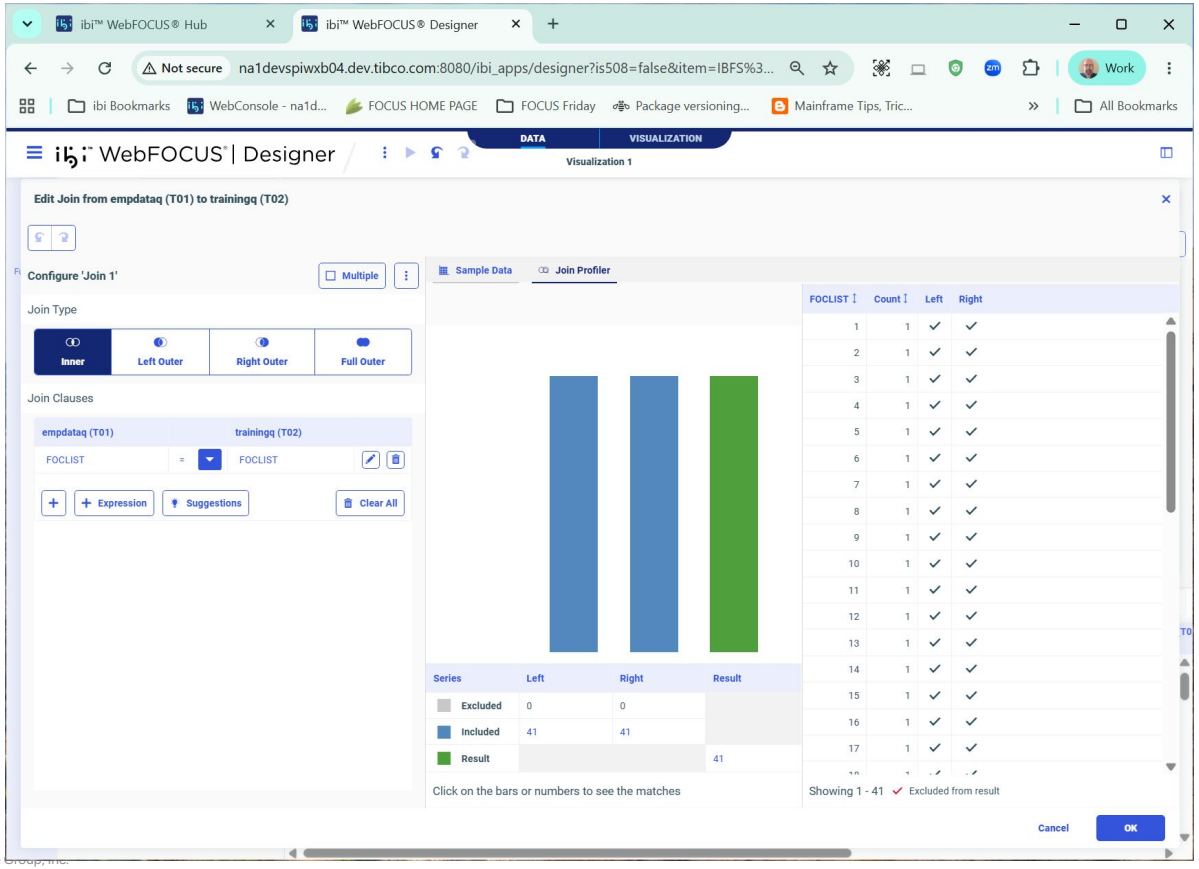
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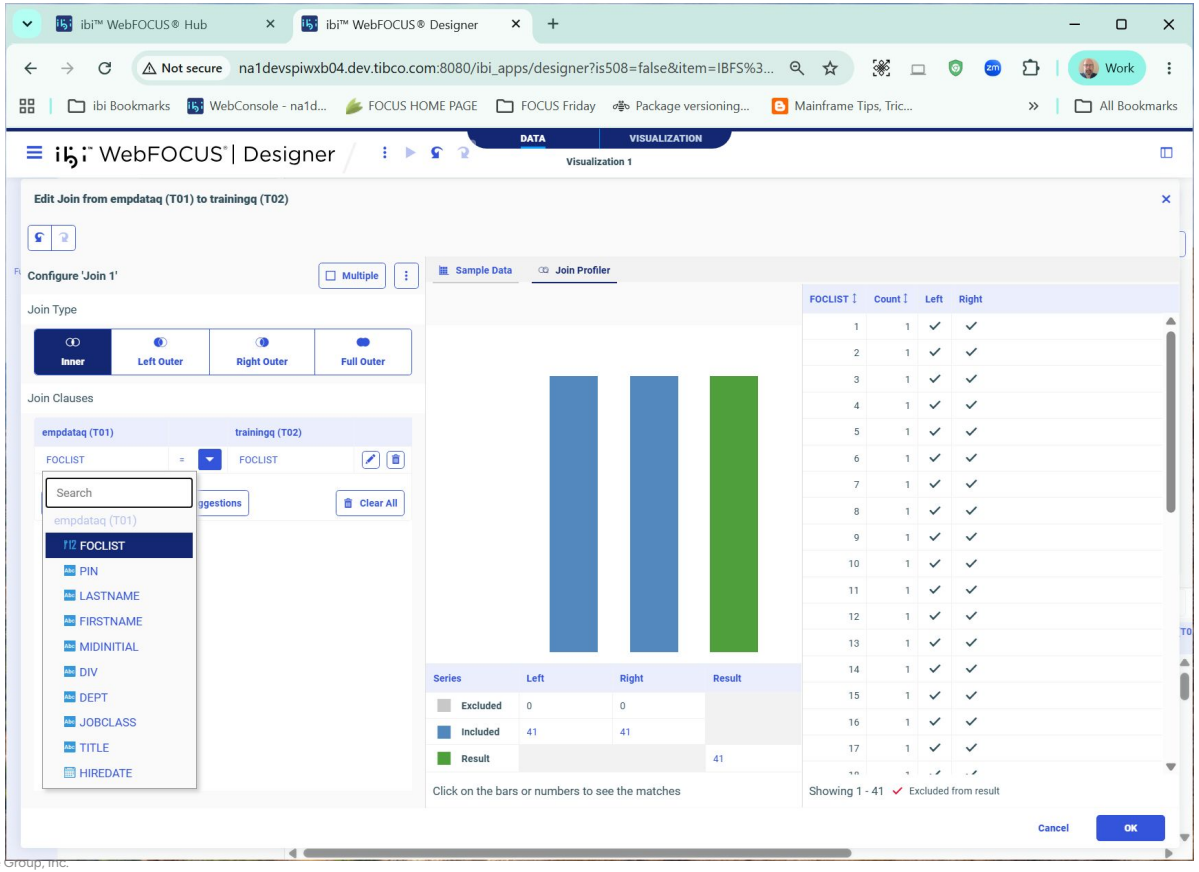
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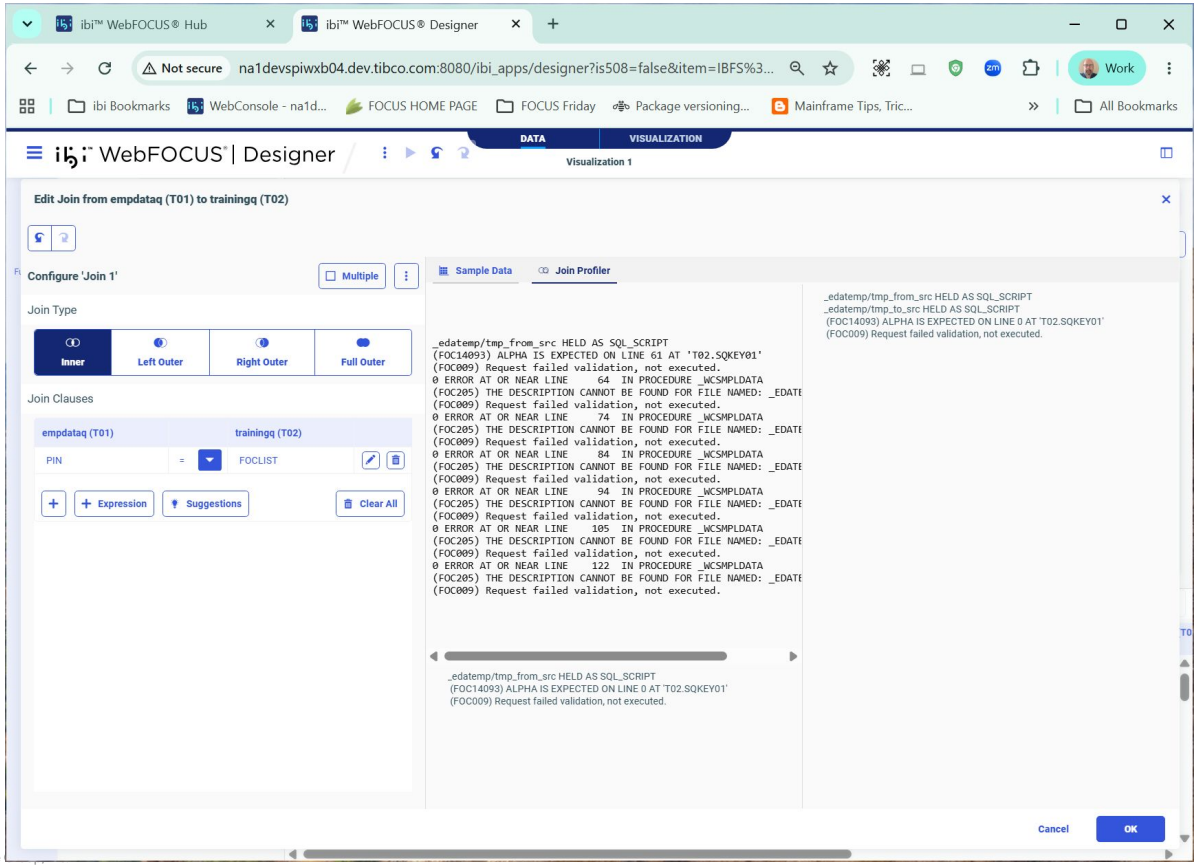
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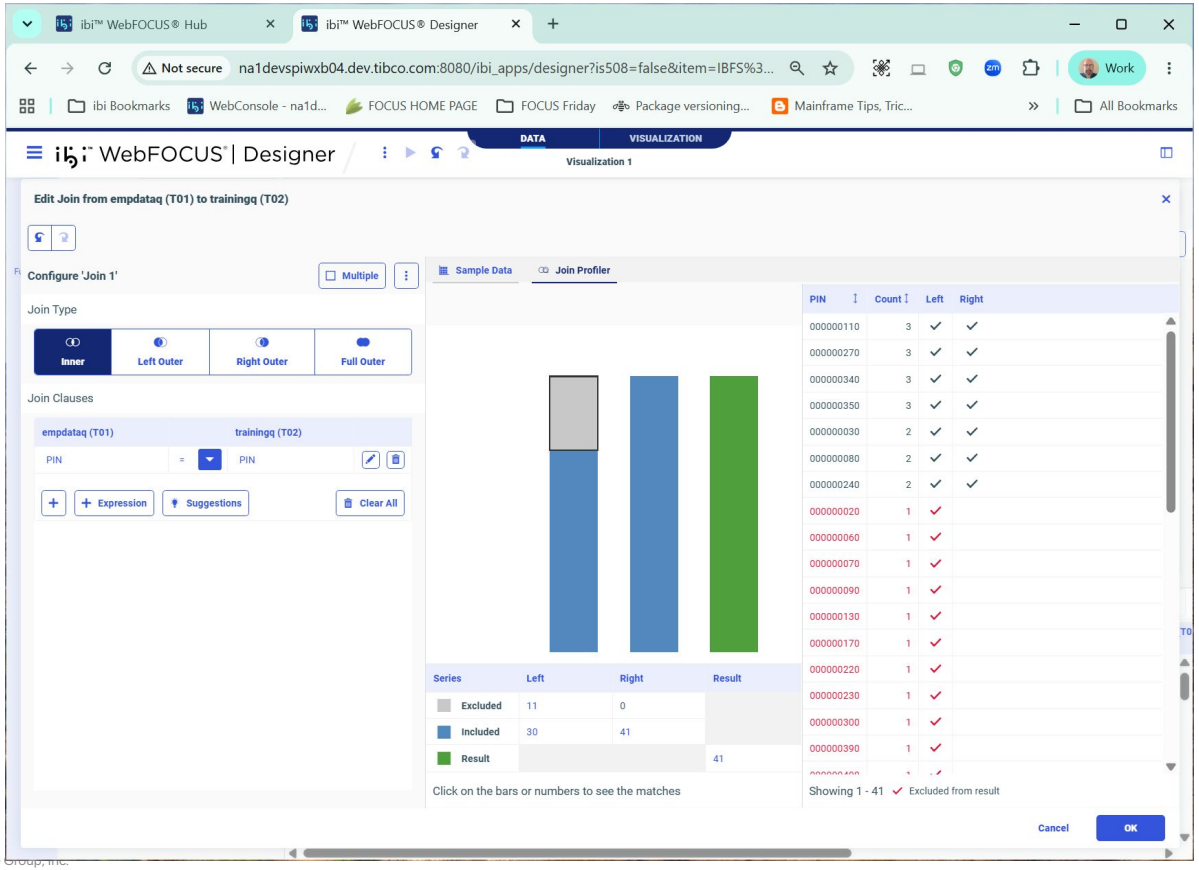
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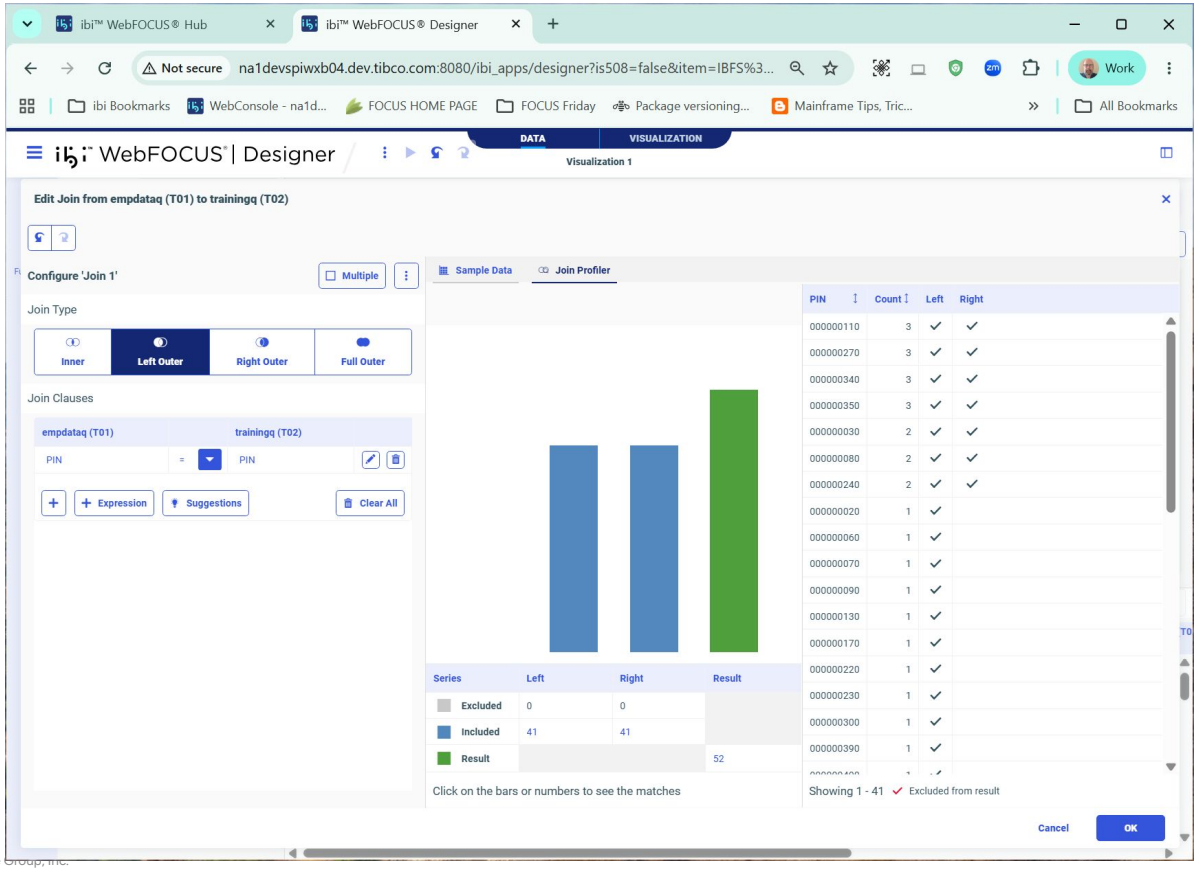
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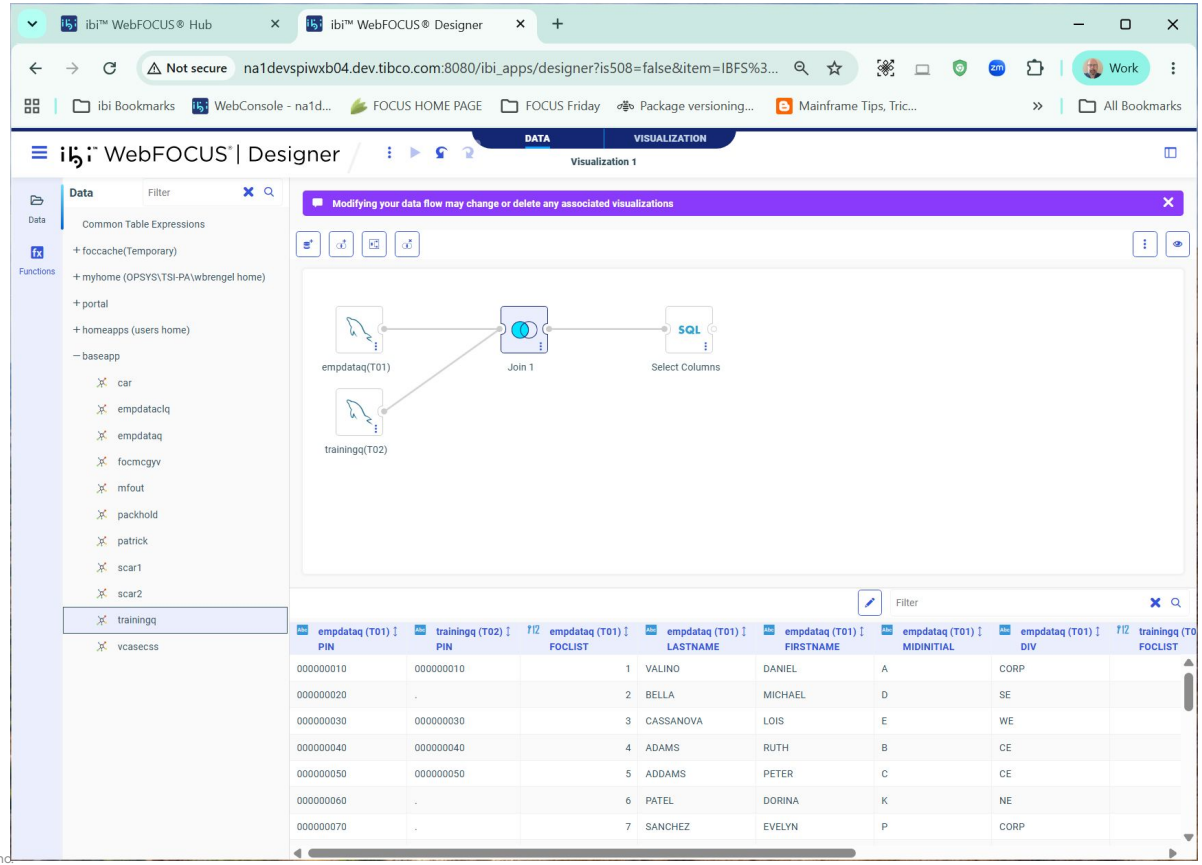
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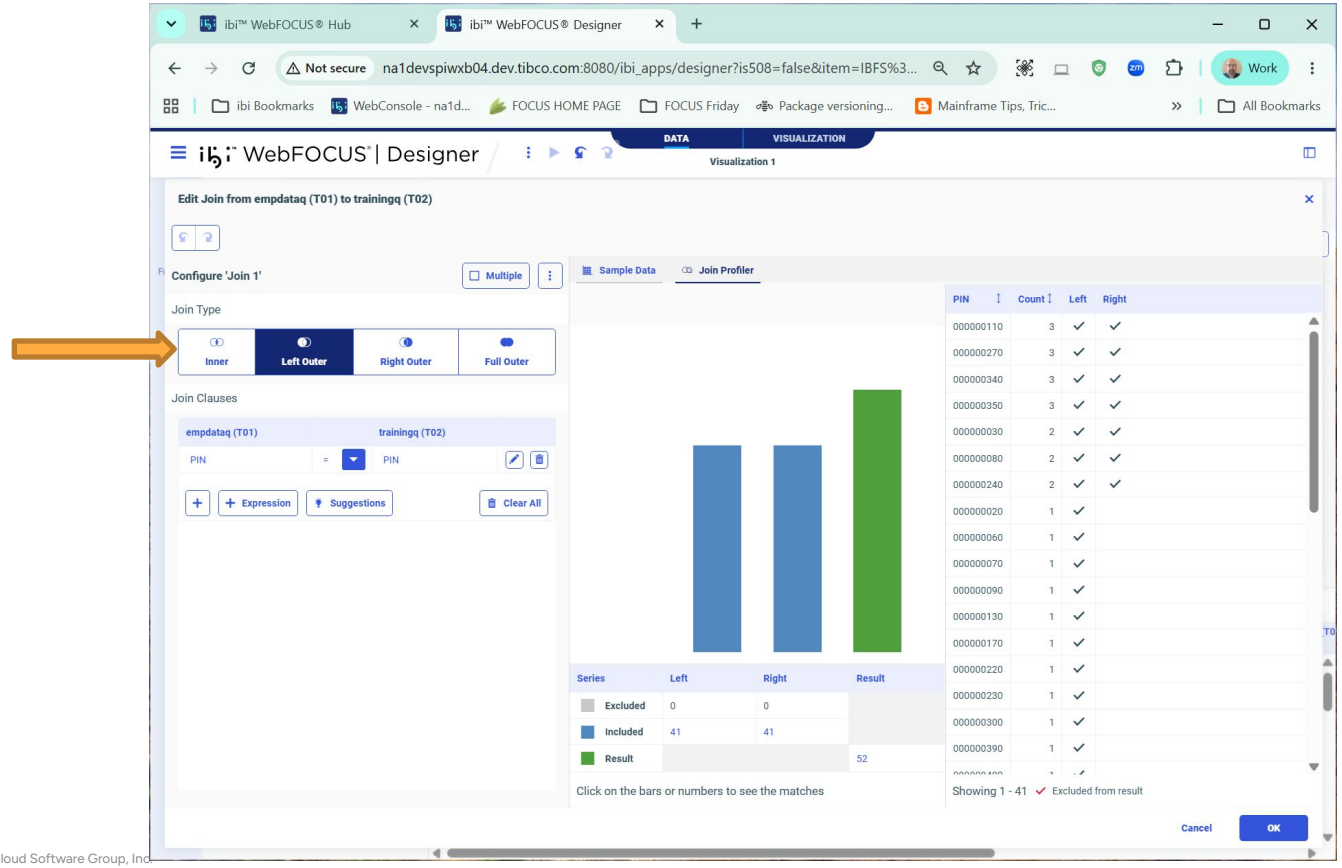
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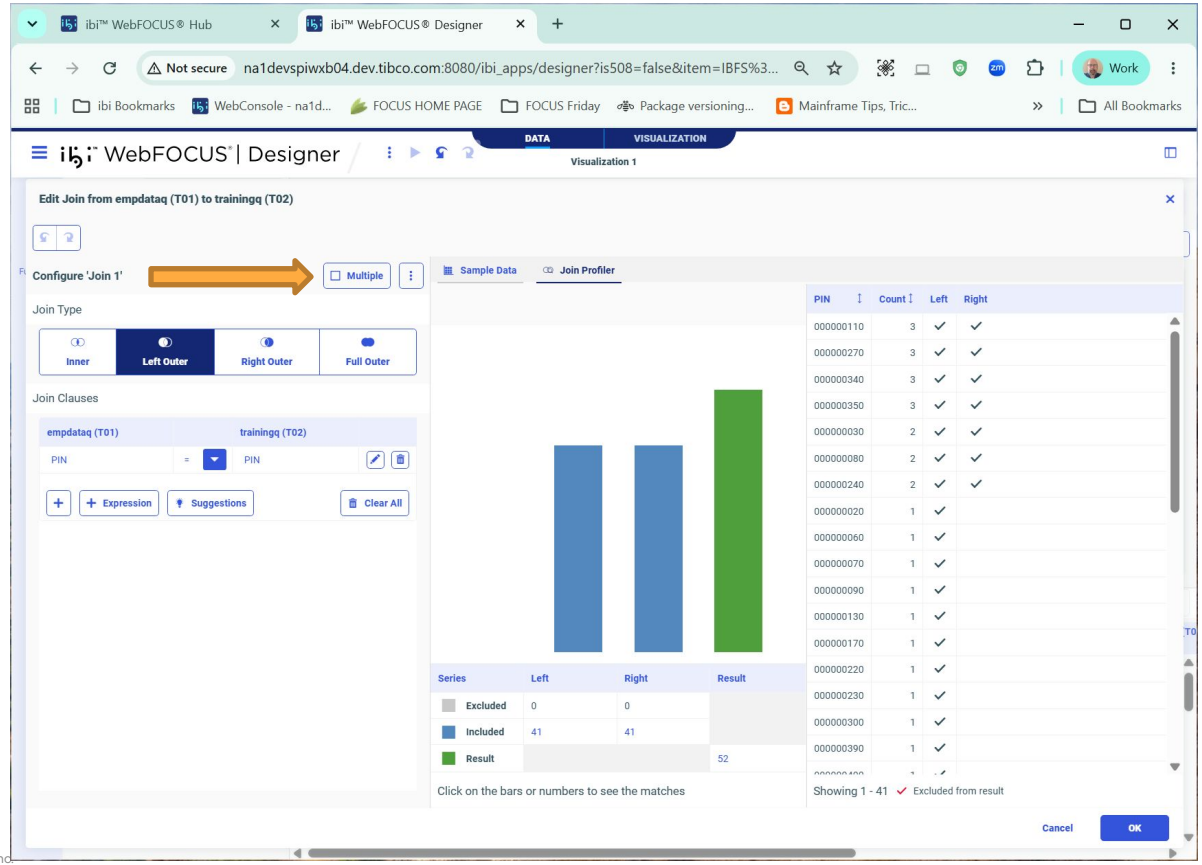
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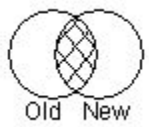
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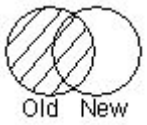
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UNIVERSAL JOIN TYPES



INNER JOIN

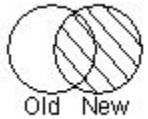
Returns only records common to both files. Represents the **INTERSECTION** of the datasets.



LEFT OUTER JOIN

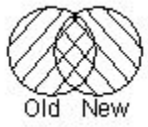
Returns all records from the first file, along with matching data from the second file.

ADAPTER-SPECIFIC JOIN TYPES



FULL OUTER JOIN

Returns all records from both files. Represents the complete **UNION** of the datasets.



RIGHT OUTER JOIN

Returns all records from the second file, along with matching data from the first file.

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Instance Type

MULTIPLE / ALL

FOCUS Managed

Returns **all matching rows** for FOCUS managed joins.

- Creates **multiple PATHs**.
- Missing children are identified by the **NODATA character** (default is a period).

SINGLE / UNIQUE

FOCUS Managed

Returns **only 1 matching row** for FOCUS managed joins.

- Child becomes part of the parent; **no path is created**.
- Missing children are identified by **zero for numeric fields** and **blank for alpha fields**.

RDBMS MANAGED

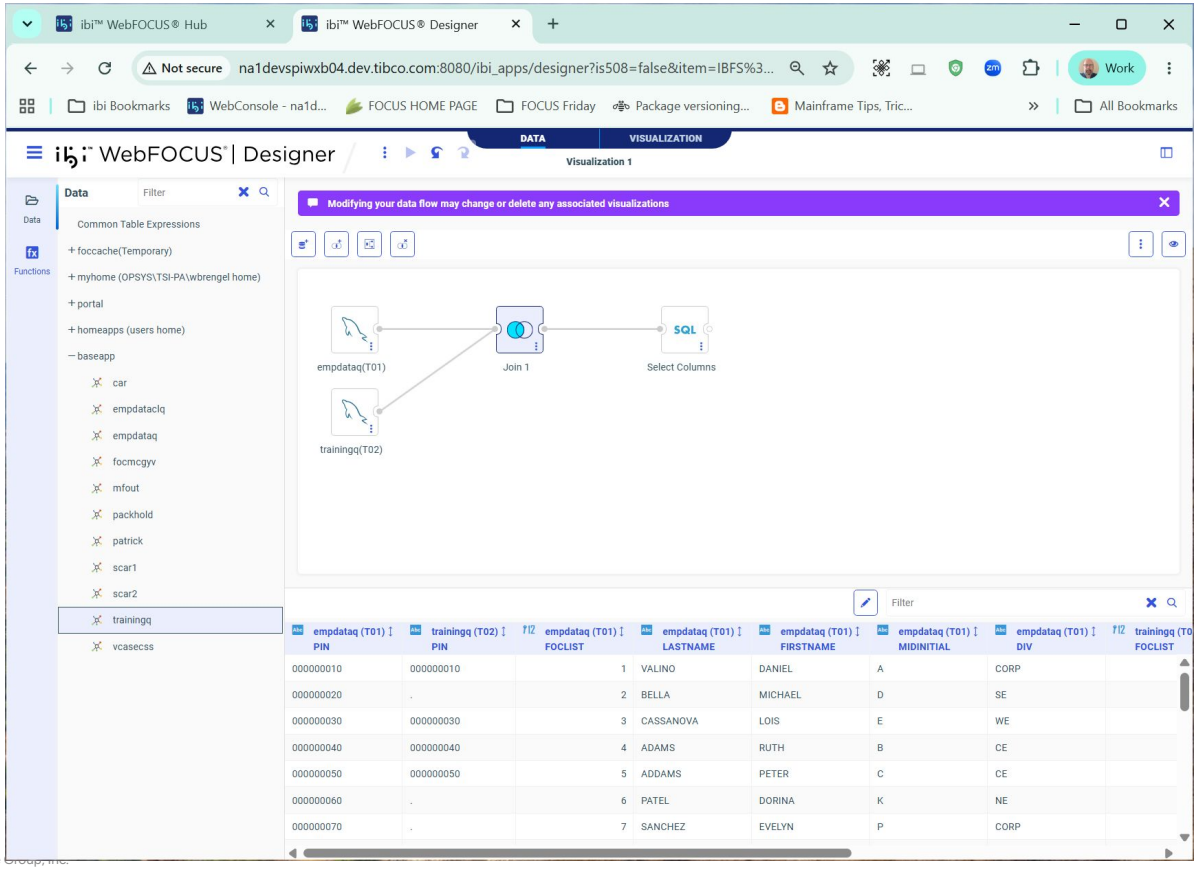
Global Behavior

Instance Type **does not affect** the result set of an RDBMS managed JOIN.

- **All matching child instances** will always be returned.
- Treatment of missing/blanks and PATH generation **still follows this setting**.

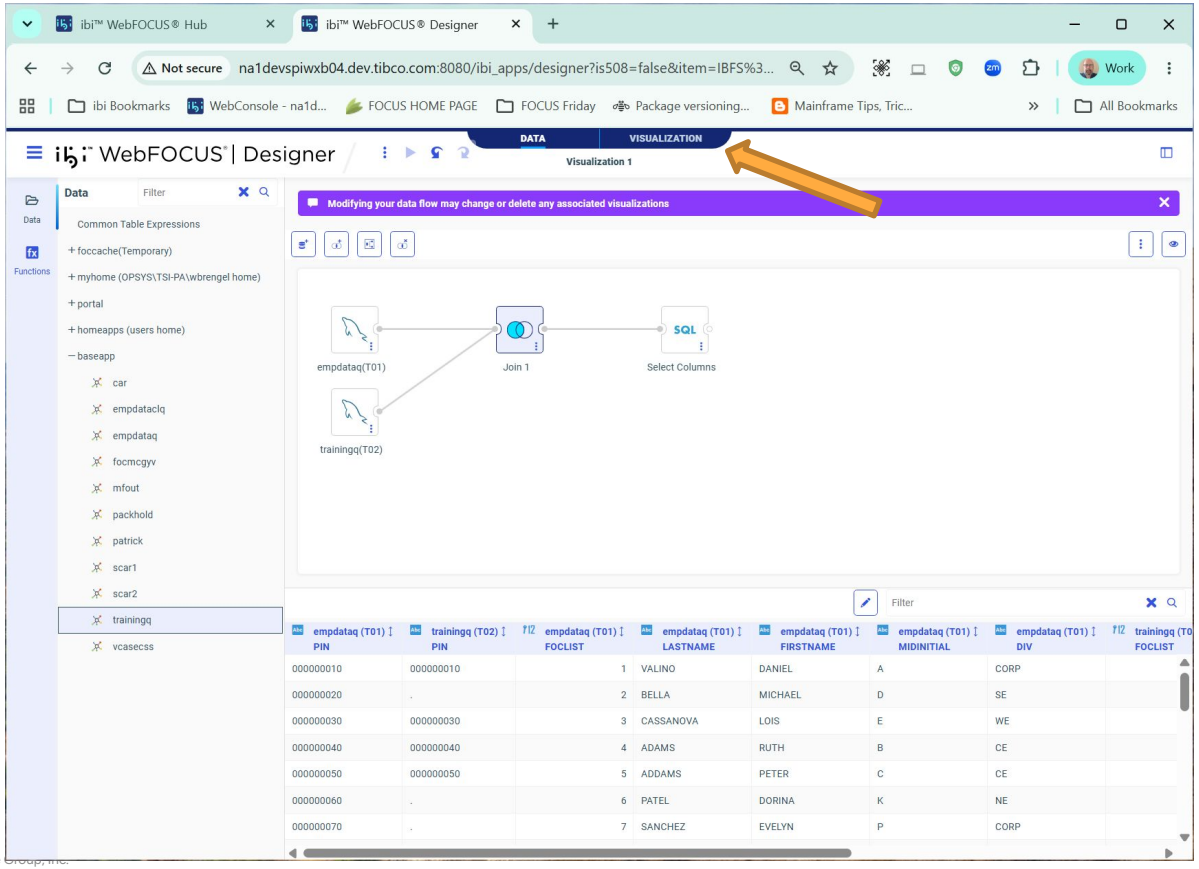
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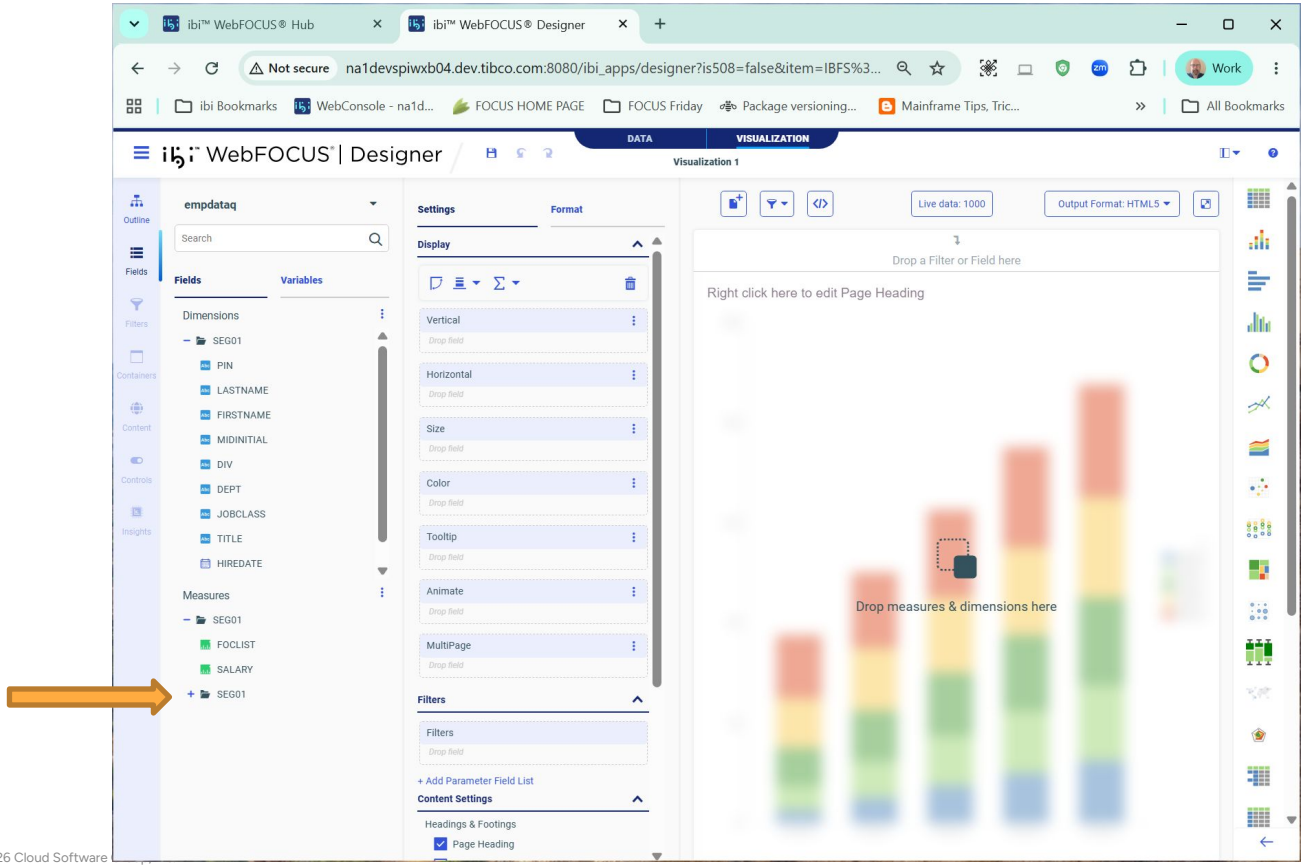
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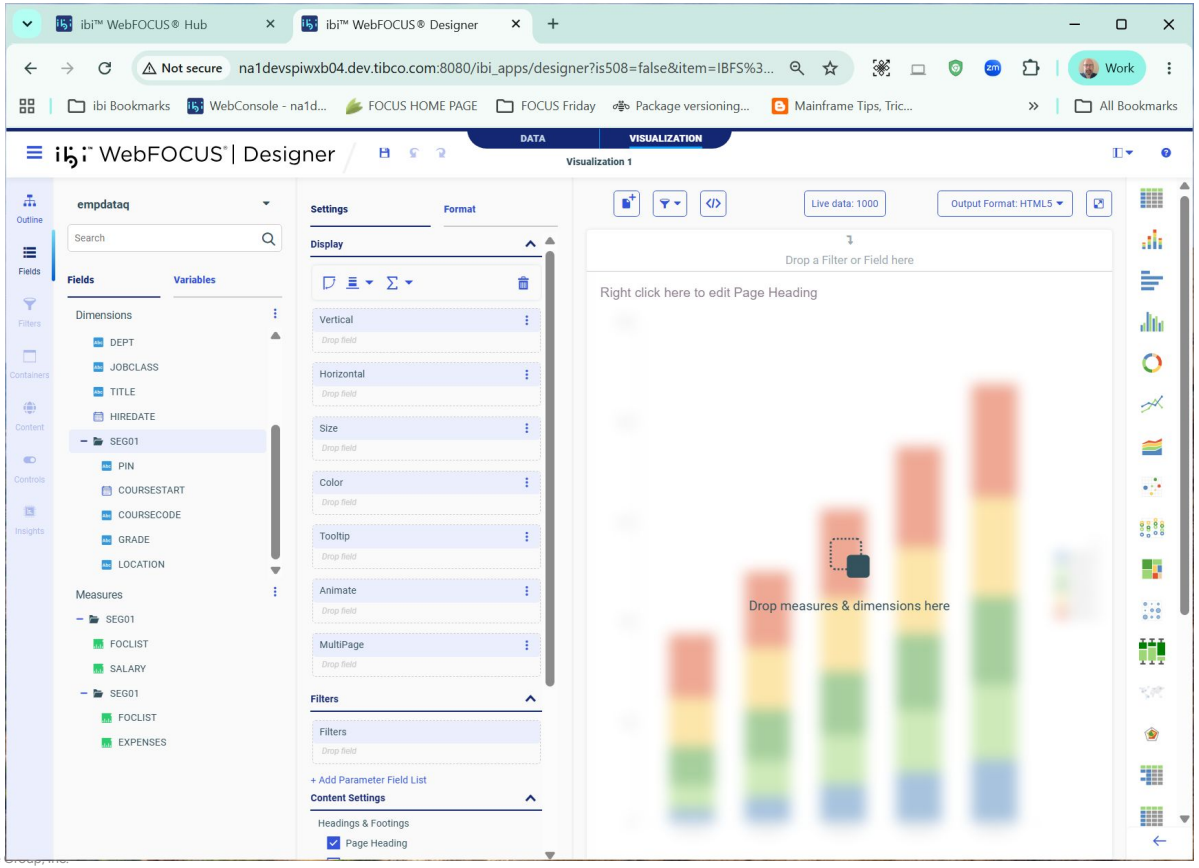
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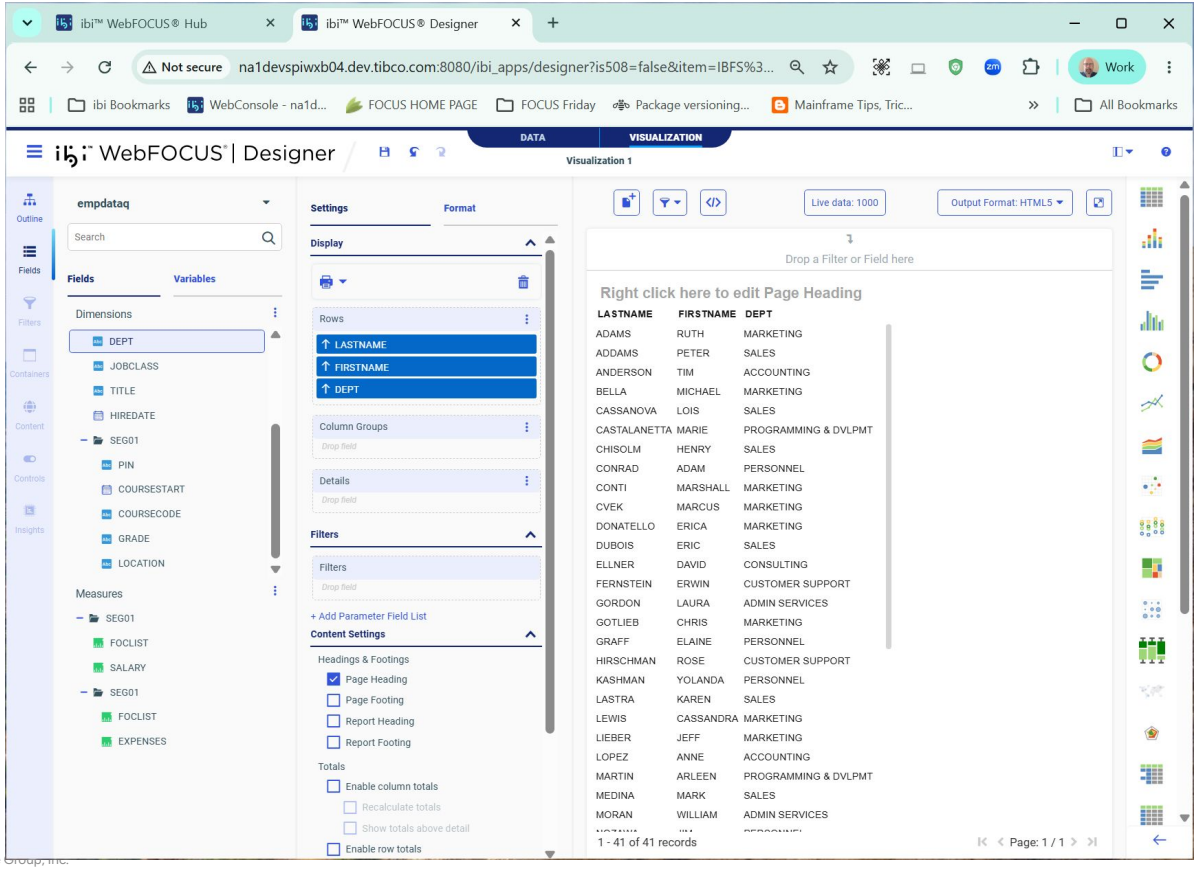
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```
JOIN
LEFT_OUTER FILE empdataq AT EMPDATAQ.SEG01.PIN
TO UNIQUE FILE trainingq AT TRAININGQ.SEG01.PIN TAG J1 AS J1
WHERE EMPDATAQ.SEG01.PIN EQ J1.SEG01.PIN;
END
```

The tools will generate a **CONDITIONAL JOIN** .

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CONDITIONAL JOIN SYNTAX

```
JOIN {LEFT_OUTER/INNER} hostfile AT hfld1 {TAG tagname}
  TO {UNIQUE/MULTIPLE} crfile AT crfld {TAG tagname}
  AS joinname
{WHERE expression1;}
{WHERE expression2;}
END
```

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EQUALITY BASED JOIN

```
JOIN {LEFT_OUTER/INNER} field {AND field …}
        IN hostfile {TAG tagname}
  TO {UNIQUE/MULTIPLE} crfield {AND crfield … }
        IN crfile {TAG tagname}
  AS joinname
END
```

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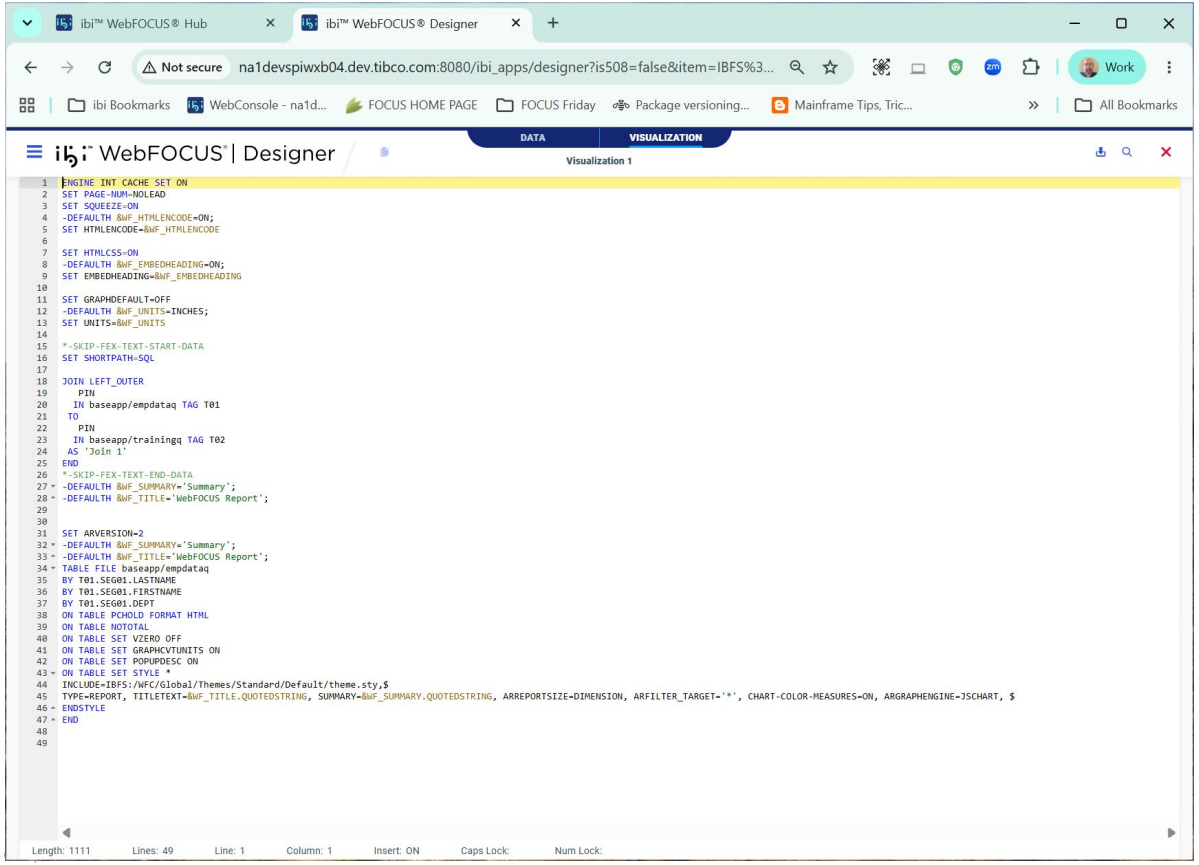
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EQUALITY BASED JOIN – DEFINE BASED

```
JOIN {LEFT_OUTER/INNER} deffield WITH field
            IN hostfile {TAG tagname}
  TO {UNIQUE/MULTIPLE} crfield
            IN crfile {TAG tagname}
  AS joinname
END
```

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SYNTAX COMPARISON

STYLE A: EXPLICIT JOIN & WHERE

```
JOIN
LEFT_OUTER FILE empdataq
AT EMPDATAQ.SEG01.PIN
TO UNIQUE FILE trainingq
AT TRAININGQ.SEG01.PIN
TAG J1 AS J1
WHERE
EMPDATAQ.SEG01.PIN EQ J1.SEG01.PIN;
END
```

STYLE B: SHORTENED SYNTAX

```
JOIN LEFT_OUTER
EMPDATAQ.SEG01.PIN
IN empdataq
TO UNIQUE TRAININGQ.SEG01.PIN
IN trainingq
TAG J1 AS J1
END
```

✔Both operations produce the exact same results, but Style B offers a cleaner, more concise syntax.

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MANAGEMENT COMPARISON

Interface Managed

Used when both the HOST and Cross-Reference tables share the same SUFFIX.

⚡ `OPTIMIZATION is ON`

- Core optimization mechanics are active
- Refer to the Trace log to verify paths

FOCUS Managed

Used when dealing with different file types across tables.

❌ `OPTIMIZATION is turned OFF`

- FOCUS automatically disables optimization
- Details can be reviewed inside TRACEs

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Left_Outer vs Inner

RDBMS Managed

Explicitly state on the JOIN command:

INNER JOIN

```
JOIN INNER
```

LEFT OUTER

```
JOIN LEFT_OUTER
```

FOCUS Managed

Controlled by UNIQUE or MULTIPLE settings:

INNER JOIN

```
JOIN TO {ALL|MULTIPLE} with SET ALL=OFF
JOIN TO UNIQUE with WHERE (KEY1 EQ KEY2)
```

LEFT OUTER

```
JOIN TO UNIQUE
JOIN TO {ALL|MULTIPLE} with SET ALL=ON
```

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CLUSTER SYNONYM

```
FILENAME=EMPDATAQ, SUFFIX=SQLMYSQL, $
SEGMENT=SEG01, SEGTYPE=S0, $
FIELDNAME=FOCLIST, ALIAS=FOCLIST, USAGE=I5, ACTUAL=I4, $
FIELDNAME=PIN, ALIAS=ID, USAGE=A9, ACTUAL=A9, $
FIELDNAME=LASTNAME, ALIAS=LN, USAGE=A15, ACTUAL=A15, $
FIELDNAME=FIRSTNAME, ALIAS=FN, USAGE=A10, ACTUAL=A10, $
FIELDNAME=MIDINITIAL, ALIAS=MI, USAGE=A1, ACTUAL=A1, $
FIELDNAME=DIV, ALIAS=CDIV, USAGE=A4, ACTUAL=A4, $
FIELDNAME=DEPT, ALIAS=CDEPT, USAGE=A20, ACTUAL=A20, $
FIELDNAME=JOBCLASS, ALIAS=CJCLAS, USAGE=A8, ACTUAL=A8, $
FIELDNAME=TITLE, ALIAS=CFUNC, USAGE=A20, ACTUAL=A20, $
FIELDNAME=SALARY, ALIAS=CSAL, USAGE=D12.2M, ACTUAL=D8, $
FIELDNAME=HIREDATE, ALIAS=HDAT, USAGE=YYMD, ACTUAL=DATE,
$
```

```
FILENAME=TRAININGQ, SUFFIX=SQLMYSQL, $
SEGMENT=SEG01, SEGTYPE=S0, $
FIELDNAME=FOCLIST, ALIAS=FOCLIST, USAGE=I5,
ACTUAL=I4, $
FIELDNAME=PIN, ALIAS=ID, USAGE=A9, ACTUAL=A9, $
FIELDNAME=COURSESTART, ALIAS=CSTART, USAGE=YYMD,
ACTUAL=DATE, $
FIELDNAME=COURSECODE, ALIAS=CCOD, USAGE=A7,
ACTUAL=A7, $
FIELDNAME=EXPENSES, ALIAS=COST, USAGE=D8.2,
ACTUAL=D8,
MISSING=ON, $
FIELDNAME=GRADE, ALIAS=GRA, USAGE=A2, ACTUAL=A2,
MISSING=ON, $
FIELDNAME=LOCATION, ALIAS=LOC, USAGE=A6, ACTUAL=A6,
MISSING=ON, $
```

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Explicit JOIN

```
JOIN LEFT_OUTER PIN IN EMPDATAQ TO ALL PIN IN TRAINGINGQ

JOIN LEFT_OUTER PIN IN EMPDATAQ TO ALL PIN IN TRAINGINGQ AS J1

JOIN LEFT_OUTER PIN IN EMPDATAQ TAG T1 TO ALL PIN IN TRAININGQ TAG T2 AS J1

JOIN LEFT_OUTER FILE EMPDATAQ AT PIN TAG T1
  TO MULTIPLE FILE TRAININGQ AT PIN TAG T2 AS J1
  WHERE T1.PIN EQ T2.PIN;

END
```

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Cluster Synonym

```
FILENAME=EMPTRAINCLUSTER
SEGNAME=EMPINFO,SEGTYPE=S0,
    CRFILE=ibisamp/empdataq,
    CRINCLUDE=ALL,$
SEGNAME=TRAININFO,SEGTYPE=S0,PARENT=EMPINFO,
    CRFILE=ibisamp/trainingq,CRINCLUDE=ALL,
    JOIN_TYPE=LEFT_OUTER,
    JOIN_WHERE=EMPINFO.PIN EQ TRAININFO.PIN;,$
```

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Cluster Synonym vs. Explicit JOIN

Method A: Cluster Synonym (Implicit)

```
TABLE FILE EMPTRAINCLUSTER
SUM EXPENSES
BY COURSECODE
END
```

Generated SQL

```
AGGREGATION DONE ...
SELECT
T2.`CCOD`,
SUM(T2.`COST`)
FROM
TRAININGQ T2
GROUP BY
T2.`CCOD`
ORDER BY
T2.`CCOD`;
```

COURSECODE	EXPENSES
AMA130	3,310.00
AMA680	2,700.00
AMA800	1,975.00
BIT420	6,950.00

Method B: Explicit JOIN

```
JOIN LEFT_OUTER PIN IN EMPDATAQ TO ALL PIN IN TRAININGQ
TABLE FILE EMPDATAQ
SUM EXPENSES BY COURSECODE
END
```

Generated SQL

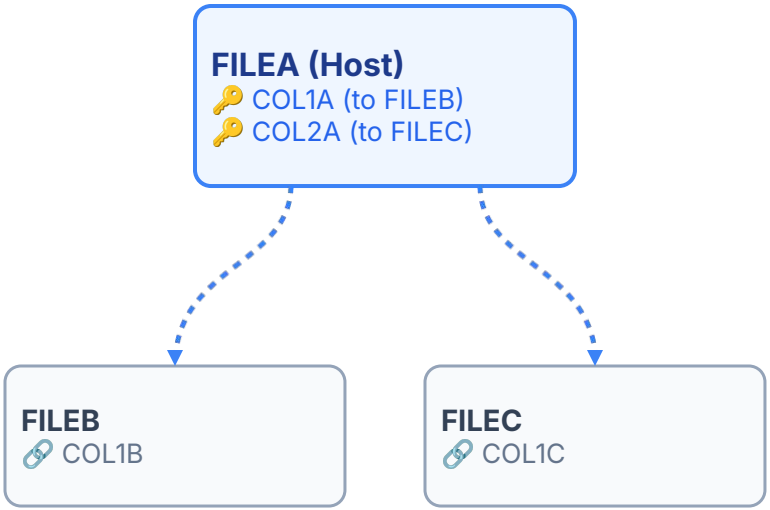
```
AGGREGATION DONE ...
SELECT
T2.`CCOD`,
SUM(T2.`COST`)
FROM
( EMPDATAQ T1
LEFT OUTER JOIN
TRAININGQ T2
ON T2.`ID` = T1.`ID` )
GROUP BY
T2.`CCOD`
ORDER BY
T2.`CCOD`;
```

COURSECODE	EXPENSES
	.
AMA130	3,310.00
AMA680	2,700.00
AMA800	1,975.00
BIT420	6,950.00

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The Many Faces Of JOIN

Multiple Tables/Files (More Than 2)



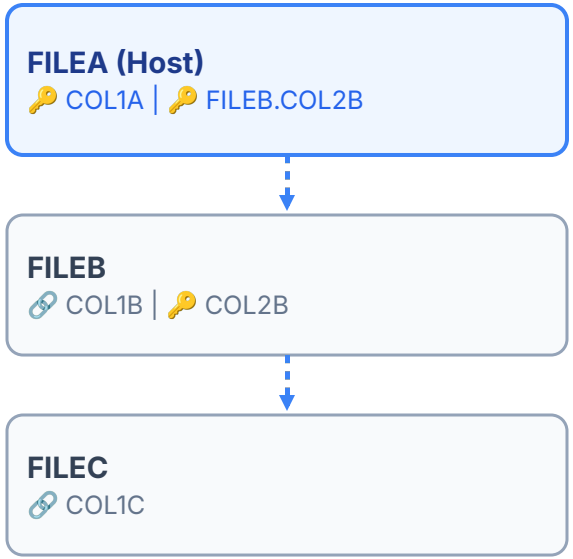

```
JOIN COL1A IN FILEA
TO MULTIPLE COL1B IN FILEB AS J1

JOIN COL2A IN FILEA
TO MULTIPLE COL1C IN FILEC AS J2
```

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The Many Faces Of JOIN

Multiple Tables/Files (More Than 2)




```
JOIN COL1A IN FILEA
  TO MULTIPLE COL1B IN FILEB AS J1

JOIN FILEB.COL2B IN FILEA
  TO MULTIPLE COL1C IN FILEC AS J2
```

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The Many Faces Of JOIN

Recursive Join (Self-Referencing)

FILEA (Host)

🔑 COL1A (Host Key)
🔑 COL2A (Target Key)

```
// 1. Standard Recursive Join
JOIN COL1A IN FILEA TO COL2A IN FILEA AS J1

// 2. Recursive Join with TAGs (Recommended)
JOIN COL1A IN FILEA TAG T1
TO COL2A IN FILEA TAG T2 AS J1
```

Syntax Note: Reference fields using either the TAG prefix (`T2.DEPT`) or the JOIN alias (`J1DEPT`). TAGs require a period separator, while JOIN aliases do not.

💡 Pro Tip

When in doubt about fieldnames, run this command to see how WebFOCUS/FOCUS interprets them:

```
?FF hostfile
```

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