Technical Highlights

July - September 2018

A technical publication, extending the value of our rich Focal Point community, and highlighting techniques, topics, and use cases to support your success with Information Builders software.
Contents

1 Introduction

3 The Added Power of Multi-Verb Requests
   Use multiple verbs to generate complex outputs

15 Intelligence, Integration, Integrity, and IoT
   Keeping an eye on IoT

19 Introducing WebFOCUS Infographics
   Transition from insight discovery to insight communication

   Learn about the world’s largest privately funded nonprofit organization

31 Learn and Connect
Information Builders customers have one characteristic in common—the ability to drive their organization's success through the development of applications or solutions powered by FOCUS, WebFOCUS, and iWay software. We're proud to support so many successful customers and to establish new channels to foster that success.

With the growing number of customers and Focal Point community users, we see increasing value in the questions and answers that are exchanged. What better time to introduce Information Builders Technical Highlights, a new technical publication, highlighting "need-to-know" techniques, How-Tos, trending topics, and use cases associated with Information Builders software.

Each issue will feature topics highlighting FOCUS, WebFOCUS, and iWay. We'll include one of our many customer success stories as well, to show how your peers are generating success at their organization. We hope that what you read will seed your creative thinking, inspire you to try something new with Information Builders software, and most of all facilitate your organization's continued success through the development of applications or solutions powered by FOCUS, WebFOCUS, and iWay.

This issue highlights:

**The Added Power of Multi-Verb Requests, by Walter Blood**
Walter shows you how to use multiple verbs to generate complex outputs.

**Intelligence, Integration, Integrity, and IoT, by David Beck and Stefan Kostial**
David and Stefan introduce you to the Internet of Things (IoT).

**Introducing WebFOCUS Infographics, by Rado Kotorov, Ph.D**
Rado introduces you to WebFOCUS Infographics, which allow you to use your existing data to tell a story and get your message across using powerful visual communications that your users can easily understand at a glance.
Customer Success Spotlight: United Way Worldwide

Learn about the world’s largest privately funded nonprofit organization and how they use WebFOCUS.

Enabling Your Customer Success

At Information Builders, customer success is our first priority. Our Customer Success teams are standing by to support you. Make a connection today!

- Join one of our Customer Success focus groups to trial developing customer success portals or new features:
  - Customer Success Center
  - KnowledgeBase
  - and more...
- Share your customer experience with us.

To join a focus group or schedule a customer experience session, contact us at Customer_Success@ibi.com.

Finally, if you have a “need-to-know” technique to share, would like to see a specific topic showcased in Information Builders Technical Highlights, or would like to share your customer success story, please contact me directly at Frances_Gambino@ibi.com. I’ll be standing by to hear about your latest success.

Enjoy!

Frances Gambino
Vice President, Customer Success
The FOCUS language supports a remarkable range of functionality, all centered around a single aggregating or detail-generating pass through the data. It includes sorting, selection, virtual field creation (both at retrieval time and prior to output time), text insertion, and subtotaling and grand totaling within the sort. Verb object prefixes allow you to modify the data. Functions can be applied both in expressions and directly to verb objects. There is a range of styling that opens the door for the artist in every one of us. And often these features are really all that are required to generate the output that you need.

But there is more here than meets the eye. The FOCUS language also supports this same amazing range of functionality when you need to make multiple passes through the data to:

- Provide aggregation at multiple levels of your sort.
- Create your own hierarchy.
- Display both aggregation values and details in the same output, allowing for common styling.
- Generate subquery-like data for use in the output generation.
- Generate hierarchical output when creating a data file.

The use of multiple verbs—like multiple clauses in a compound complex sentence—allows us to easily generate complex outputs.

**The Basic Rules**

- You can use up to 64 verbs in a single request.
- You can only have one detail verb, PRINT or LIST, and it must be the last verb in the request.
- Sort fields must be nested within higher level sorts. Fields aggregated at the same sort level will be displayed together.
- Selection criteria are applied to the lowest sort level containing the fields selected.
Creating Multi-Verb Requests in App Studio
Let’s start by creating a report from the ggsales file, which you can set up using the Tutorial in the Web Console. Select the following fields in this order from the Object Inspector:

REGION
ST
CITY
DOLLARS
DOLLARS
DOLLARS

Notice how the DOLLARS fields are all aggregated and the REGION, ST, and CITY fields are set up as sort fields.

There is a range of styling that opens the door for the artist in every one of us. And often these features are really all that are required to generate the output that you need.
We then change to the Sort Groups view in the Object Inspector.

Click the DOLLARS in the fourth row and drag it to REGION. This creates Sort Group 1.
Finally, click the first DOLLARS in Sort Group 2 and drag it to ST, producing three sort groups.

Running this request generates the following output, showing the aggregated value at the three different levels.

<table>
<thead>
<tr>
<th>Region</th>
<th>Dollar Sales</th>
<th>State</th>
<th>Dollar Sales</th>
<th>City</th>
<th>Dollar Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midwest</td>
<td>11400685</td>
<td>IL</td>
<td>3924401</td>
<td>Chicago</td>
<td>3924401</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MO</td>
<td>3781286</td>
<td>St. Louis</td>
<td>3761286</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TX</td>
<td>3714978</td>
<td>Houston</td>
<td>3714978</td>
</tr>
<tr>
<td>Northeast</td>
<td>11392300</td>
<td>CT</td>
<td>3782049</td>
<td>New Haven</td>
<td>3782049</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA</td>
<td>3707986</td>
<td>Boston</td>
<td>3707986</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NY</td>
<td>3902265</td>
<td>New York</td>
<td>3902265</td>
</tr>
<tr>
<td>Southeast</td>
<td>11710379</td>
<td>FL</td>
<td>3923215</td>
<td>Orlando</td>
<td>3923215</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GA</td>
<td>4100107</td>
<td>Atlanta</td>
<td>4100107</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TN</td>
<td>3687057</td>
<td>Memphis</td>
<td>3687057</td>
</tr>
<tr>
<td>West</td>
<td>11652946</td>
<td>CA</td>
<td>7642261</td>
<td>Los Angeles</td>
<td>3772003</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>San Francisco</td>
<td>3870258</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WA</td>
<td>4010685</td>
<td>Seattle</td>
<td>4010685</td>
</tr>
</tbody>
</table>
The hierarchy showing the total dollar sales by region, by state, and by city, is displayed in three distinct dollar sales columns. To bring these values into a single column displaying the hierarchy vertically, you can SET DUPLICATECOL = OFF using the SET tool.

<table>
<thead>
<tr>
<th>Region</th>
<th>State</th>
<th>City</th>
<th>Dollar Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midwest</td>
<td>IL</td>
<td>Chicago</td>
<td>$3,924,401</td>
</tr>
<tr>
<td></td>
<td>MO</td>
<td>St. Louis</td>
<td>$3,761,286</td>
</tr>
<tr>
<td></td>
<td>TX</td>
<td>Houston</td>
<td>$3,714,978</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$11,400,685</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$3,924,401</td>
</tr>
<tr>
<td>Northeast</td>
<td>CT</td>
<td>New Haven</td>
<td>$3,782,049</td>
</tr>
<tr>
<td></td>
<td>MA</td>
<td>Boston</td>
<td>$3,707,986</td>
</tr>
<tr>
<td></td>
<td>NY</td>
<td>New York</td>
<td>$3,902,265</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$11,392,300</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$3,782,049</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$3,707,986</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$3,902,265</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$11,710,379</td>
</tr>
<tr>
<td>Southeast</td>
<td>FL</td>
<td></td>
<td>$3,923,215</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$11,710,379</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$3,923,215</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$11,710,379</td>
</tr>
</tbody>
</table>

You can even go as far as converting the lowest level sort in your hierarchy to an ACROSS field, with the following results:
The most obvious effect of using multiple verbs is the generation of hierarchies.

Underneath it all, the FOCUS code that generates this request is more explicit about the structure of the hierarchy. Notice that the entire hierarchy is repeated with each verb.

```plaintext
01   TABLE FILE IBISAMP/GGSales
02     SUM
03     GGSales.Sales01.Dollars/108!D
04     BY GGSales.Sales01.Region
05     SUM
06     GGSales.Sales01.Dollars/108!D
07     BY GGSales.Sales01.Region
08     BY GGSales.Sales01.St
09     SUM
10     GGSales.Sales01.Dollars/108!D
11     BY GGSales.Sales01.Region
12     BY GGSales.Sales01.St
13     BY GGSales.Sales01.City
14   ON TABLE SET PAGE-NOLEAD
15   ON TABLE SET ASNAMES ON
16   ON TABLE NOTOTAL
17   ON TABLE PCHOLD FORMAT HTML
18   ON TABLE SET HTMLM Em bedding ON
19   ON TABLE SET HTMLCSS ON
20   ON TABLE SET STYLE *
21     INCLUDE = warm,
22   $
23   ENDSTYLE
24  END
```

Creating Your Own Hierarchy

The most obvious effect of using multiple verbs is the generation of hierarchies. This is the result of the requirement for nested sorts. How can you make use of this behavior? For the natural hierarchies in your data—like date and time, and geographical location—the use of multi verbs for drilldowns is obvious. But what about the less obvious, or more improbable possibilities? We use hierarchies for analysis because they provide a known, possibly dimensional, structure that makes comparison easy. Consider the time dimension, the lowest level being days, aggregated to weeks or months, aggregated to quarters, and finally aggregated to years. We can look for trends and drill into any level where the data seems unexpected or out-of-place to examine the details, and ultimately look for hints as to the cause.
Are there hierarchies that apply to your data that are not represented by time or location? For example, order type, delivery method, staff requirements, or customer education and experience? What you build your hierarchy with is entirely under your control.

I may be convinced that the product sales on a given day of the week are related to the cost of the product, where the consumer resides, and how it is being sold—web versus store.

Further, I might want to see if the patterns in these variations are the same, or if there are variations that can be detected and explained by the dimensions that we are working with.

Including these fields as sorts, and aggregating revenue in the wf_retail_lite database, gives us a report that shows the aggregated values at only the lowest level.

```
TABLE FILE WF_RETAIL_LITE
SUM WF_RETAIL_LITE.WF_RETAIL_SALES.REVENUE_US
BY WF_RETAIL_LITE.WF_RETAIL_STORE_SALES.STORE_NAME
SUM WF_RETAIL_LITE.WF_RETAIL_SALES.REVENUE_US
BY WF_RETAIL_LITE.WF_RETAIL_STORE_SALES.STORE_NAME
ACROSS LOWEST WF_RETAIL_LITE.WF_RETAIL_PRODUCT.PRODUCT_CATEGORY
ON TABLE SET PAGE=NUM NOLOAD
ON TABLE SET ASNAMES ON
ON TABLE NOTOTAL
ON TABLE PCHOLD FORMAT HTML
ON TABLE SET HTMLEMBEDING ON
ON TABLE SET HMSCSS ON
ON TABLE SET STYLE *
  INCLUDE = engolden, $ 
END_STYLE
END
```

<table>
<thead>
<tr>
<th>Sale Day</th>
<th>Store Type</th>
<th>Product Category</th>
<th>Customer State</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>California</td>
<td>$166,636.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Illinois</td>
<td>$156,369.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Michigan</td>
<td>$133,496.73</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>New York</td>
<td>$264,690.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Texas</td>
<td>$318,181.89</td>
</tr>
<tr>
<td></td>
<td>Store Front</td>
<td>Televisions</td>
<td>Illinois</td>
<td>$148,022.08</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Michigan</td>
<td>$113,520.19</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>New York</td>
<td>$248,651.52</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Texas</td>
<td>$330,178.95</td>
</tr>
<tr>
<td></td>
<td>Web</td>
<td>Televisions</td>
<td>Texas</td>
<td>$130,422.54</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>California</td>
<td>$113,746.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Illinois</td>
<td>$201,652.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>New York</td>
<td>$276,791.41</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Texas</td>
<td>$353,769.04</td>
</tr>
<tr>
<td></td>
<td>Web</td>
<td>Televisions</td>
<td>Texas</td>
<td>$119,774.96</td>
</tr>
</tbody>
</table>
Turning this into a multi-verb report increases the information that is made available to the user, providing totals for comparison at each level.

<table>
<thead>
<tr>
<th>Day Name</th>
<th>Revenue</th>
<th>Store Type</th>
<th>Revenue</th>
<th>Product Category</th>
<th>Revenue</th>
<th>State Province</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRI</td>
<td>$3,426,673.65</td>
<td>Store Front</td>
<td>$2,250,183.51</td>
<td>Televisions</td>
<td>$2,250,183.51</td>
<td>California</td>
<td>$166,636.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Illinois</td>
<td>$156,369.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Michigan</td>
<td>$133,466.73</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>New York</td>
<td>$264,080.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Texas</td>
<td>$318,181.89</td>
</tr>
<tr>
<td>MON</td>
<td>$3,344,482.36</td>
<td>Store Front</td>
<td>$2,180,428.47</td>
<td>Televisions</td>
<td>$2,180,428.47</td>
<td>Illinois</td>
<td>$148,822.08</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Michigan</td>
<td>$113,920.19</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>New York</td>
<td>$248,051.52</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Texas</td>
<td>$320,178.95</td>
</tr>
<tr>
<td>SAT</td>
<td>$3,364,953.90</td>
<td>Store Front</td>
<td>$2,239,376.89</td>
<td>Televisions</td>
<td>$2,239,376.89</td>
<td>California</td>
<td>$113,746.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Illinois</td>
<td>$201,052.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>New York</td>
<td>$276,791.41</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Texas</td>
<td>$353,760.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$119,774.98</td>
</tr>
</tbody>
</table>

```
1: TABLE FILE WF_RETAIL_LITE
2: SUM
3: BY LOWEST WF_RETAIL_LITE.WF_RETAIL_TIME_SALES.TIME_DAYNAME
4: SUM
5: BY WF_RETAIL_LITE.WF_RETAIL_TIME_SALES.TIME_DAYNAME
6: SUM
7: BY WF_RETAIL_LITE.WF_RETAIL_STORE_SALES.STORE_TYPE
8: SUM
9: BY WF_RETAIL_LITE.WF_RETAIL_STORE_SALES.STORE_TYPE
10: SUM
11: WHERE COUNTRY_NAME EQ 'United States';
12: WHERE PRODUCT_CATEGORY EQ 'Televisions';
13: WHERE TOTAL_REVENUE US GE 100000;
14: ON TABLE SET ASNAMES ON
```
Using Multiple Verbs to Include Both Summary and Detail in the Same Report

Perhaps one of the simplest and most effective uses of multi-verb requests is to create reports that contain both summary data and detail information to support that summary. The basic mechanism is to create a multi-verb request and ensure that the verb at the lowest sort level provides the detail that you need. You may need to change the verb at the lowest level to either PRINT or LIST.

<table>
<thead>
<tr>
<th>Store Name</th>
<th>Revenue</th>
<th>Product Category</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amsterdam</td>
<td>$26,865,793.34</td>
<td>Accessories</td>
<td>$3,291,437.94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Camcorder</td>
<td>$3,865,579.61</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Computers</td>
<td>$2,146,167.97</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Media Player</td>
<td>$6,536,673.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stereo Systems</td>
<td>$7,480,434.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Televisions</td>
<td>$2,122,953.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Video Production</td>
<td>$1,422,046.94</td>
</tr>
<tr>
<td>Anchorage</td>
<td>$5,725,054.71</td>
<td>Accessories</td>
<td>$706,994.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Camcorder</td>
<td>$827,433.44</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Computers</td>
<td>$649,444.73</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Media Player</td>
<td>$1,261,933.38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stereo Systems</td>
<td>$1,589,822.92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Televisions</td>
<td>$384,724.90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Video Production</td>
<td>$305,661.12</td>
</tr>
<tr>
<td>Arlington</td>
<td>$4,425,088.45</td>
<td>Accessories</td>
<td>$514,367.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Camcorder</td>
<td>$685,911.87</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Computers</td>
<td>$526,579.53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Media Player</td>
<td>$384,680.16</td>
</tr>
</tbody>
</table>

In this case, the SUM verb gives us the level of detail at the product category level that we want to see in the breakdown of the store totals.

```sql
TABLE FILE WF_Retail_Lite
SUM
WF_Retail_Lite.WF_Retail_Sales.Revenue US
BY WF_Retail_Lite.WF_Retail_Store_Sales.Store_Name
SUM
WF_Retail_Lite.WF_Retail_Sales.Revenue US
BY WF_Retail_Lite.WF_Retail_Store_Sales.Store_Name
BY LOWEST WF_Retail_Lite.WF_Retail_Product.Product_Category
ON TABLE SET PAGE=NUM NOLEAD
ON TABLE SET ASNAMES ON
ON TABLE NOTOTAL
ON TABLE PCHOLD FORMAT HTML
ON TABLE SET HTMLMBEDING ON
ON TABLE SET HTMLCSS ON
ON TABLE SET STYLE *
INCLUDE = engolden,
ENDSTYLE
END
```
Technical Highlights
The Added Power of Multi-Verb Requests

With a simple change of the lowest level sort to ACROSS, this can also be displayed in the following way. The initial Revenue column is broken down into the product category components across the row.

<table>
<thead>
<tr>
<th>State</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amsterdam</td>
<td>$26,865,293.34</td>
</tr>
<tr>
<td>Anchorage</td>
<td>$7,525,954.71</td>
</tr>
<tr>
<td>Anchorage</td>
<td>$3,126,967.81</td>
</tr>
<tr>
<td>Alabama</td>
<td>$373,372.50</td>
</tr>
<tr>
<td>Atlanta</td>
<td>$8,251,775.30</td>
</tr>
<tr>
<td>Bangalore</td>
<td>$854,255.02</td>
</tr>
<tr>
<td>Bangkok</td>
<td>$95,700.79</td>
</tr>
<tr>
<td>Barcelona</td>
<td>$994,604.39</td>
</tr>
<tr>
<td>Beijing</td>
<td>$53,623.95</td>
</tr>
<tr>
<td>Belfast</td>
<td>$23,307.90</td>
</tr>
<tr>
<td>Berlin</td>
<td>$25,518,094.26</td>
</tr>
<tr>
<td>Boston</td>
<td>$2,245,788.65</td>
</tr>
<tr>
<td>Boston</td>
<td>$4,445,441.83</td>
</tr>
<tr>
<td>Buenos Aires</td>
<td>$25,074,011.78</td>
</tr>
<tr>
<td>Brussels</td>
<td>$20,304,328.22</td>
</tr>
<tr>
<td>Budapest</td>
<td>$13,053,730.06</td>
</tr>
<tr>
<td>Cairo</td>
<td>$41,881.01</td>
</tr>
</tbody>
</table>

Should you need to drill down to or display the lowest level of the hierarchy, you may need to use the PRINT or LIST verb. This will display a row for every record that is read and selected, which could be somewhat large. When working at this level, use WHERE to limit the amount of data that is read.

Using Multi-Verbs to Create Selection Criteria

In SQL, subqueries are often used to bring in data that will be used in the selection process for the main request. In the FOCUS language, this can be done in several ways: creating a request to gather the selection criteria values and placing them in a HOLD or SAVE file, followed by the main request that uses the WHERE IN file syntax to use that data; or JOINing to the file that contains the selection criteria values prior to creating the request. If the selection criteria that you need to use is a function of the data that you are already reading, then multi-verb requests can also provide you with a solution.

For instance, if your selection is based upon including data only for the highest selling product, then you can collect that data in the highest level of a multi-verb request, and use it for selection—WHERE TOTAL selection—to limit the request to including only data for that product, as in the following:
Notice that the selection value in the WHERE TOTAL phrase is created in the highest level sort of the multi-verb request. That value can be displayed or made invisible with NOPRINT, as shown in the example above.

Likewise, you can also use other prefix operators, like AVE., MIN., FST., and LST., to create additional conditions. However, you are not restricted to only verb objects here. COMPUTEes can be used at this level to generate more complicated values.

We will explore multi-verb functionality further in a future topic, for next time however, we will examine MATCH and the new behavior that makes this command so powerful.
Information Builders: Intelligence, Integration, Integrity, and IoT

By David Beck, Product Manager, Information Builders
Stefan Kostial, Director, Technical Content Services, Information Builders

Keeping an eye on IoT

What Is the Internet of Things (IoT)?
The Internet of Things (IoT) is an ecosystem that includes physical devices and objects, as well as the hardware, software, and sensors, that communicate over an IP network, enabling those devices and objects to collect and share data.

IoT is an instance of the more extensive general class of cyber-physical systems (for example, smart homes, smart health, intelligent transportation, smart cities, and smart grids, such as power plants). IoT is also finding uses in shopping centers, agriculture, medical applications, environmental monitoring, and security.

IoT devices/sensors collect data and then autonomously move this data to other devices and to sophisticated engines capable of performing analytics based on that information.
Today, IoT is helping organizations enhance their products and services, monitor operations in real time, track sales and other activity, develop location-based discounts, assess and manage customer experience, and uncover operational improvements.

Information Builders technology tools help you transform big data from IoT into something truly useful. By breaking down data silos, cleansing the data, and integrating it with your existing data, we enable you to share those insights with stakeholders in real time, making your enterprise more productive and efficient.

**Where Does iWay Service Manager Fit In?**
iWay Service Manager (iSM) enables organizations to create, compose, and operate services, whether deployed as web services, APIs, or through other interfaces. By helping organizations reuse existing application and infrastructure investments, iSM lays the foundation for a quickly deployable and easily maintainable service-oriented and event-oriented architecture for IoT.

iSM Release 8 now offers integrated support for IoT applications with multiple roles in an IoT-based solution, including recipient, emitter, concentrator, and device.
iSM participates in IoT networks. It interacts with and acts as an IoT device, while also collecting and analyzing IoT messages. Consider the following use cases and scenarios:

- In a hospital setting, blood pressure sensors continuously send readings to iSM, which aggregates this data. Based on the resulting data, iSM can recognize unexpected patterns and send an immediate alert to a medical team.

- In a facility, access cards are used to operate automatic door locks. When an employee swipes their card, iSM is notified of the request for entry and checks against an employee database. If the employee is allowed access, iSM sends a signal to the automatic door lock, which unlocks the door.

iSM is a small, fast, and secure enterprise service bus (ESB) widely used around the world. With the introduction of many common IoT protocols, iSM can be effectively utilized in IoT networks. IoT-oriented protocols natively supported by iSM include:

- **MQTT (Message Queuing Telemetry Transport)**
  MQTT enables a publish/subscribe messaging model in an extremely lightweight way. It is utilized for connections where a small code footprint is required and/or network bandwidth is at a premium.

- **CoAP (Constrained Application Protocol)**
  CoAP is an application layer protocol widely used in resource-constrained devices, such as wireless sensor nodes.

- **ZeroMQ (Zero MQ Distributed Transport Layer)**
  ZeroMQ is a high performance asynchronous network protocol used in distributed or concurrent applications.
In addition, iSM supports other protocols often used in IoT solutions, including Advanced Message Queuing Protocol (AMQP or RabbitMQ), REpresentational State Transfer (REST), WebSockets, and SOAP.

iSM can listen and emit on these protocols, giving it an easy place within a configured IoT network. In addition, iSM can be distributed on a single board computer (for example, Raspberry Pi), so that it can itself become a node on the IoT network.

In addition, when joined with Information Builders WebFOCUS enterprise business intelligence (BI) and analytics platform, iWay can make it easier to integrate IoT applications into your enterprise.

For example, Raspberry Pi single board computers are placed on the edges of a network. Each device has a copy of iSM installed. In this scenario, each iSM instance is acting as a sensor to monitor a specific condition (for example, temperature). The devices can be configured to communicate with each other to exchange temperature readings or to a standalone instance of iSM, which summarizes this data and then relays this data to WebFOCUS for further analytics and reporting.

Combining the newly integrated support for IoT applications with iSM ensures that a complete IoT-based solution can be quickly realized today, without additional modifications to your existing iSM framework. This directly translates to savings in cost and time.
Infographics are fast becoming the preferred method of delivering government, corporate, and other organizational information to large numbers of information consumers. Infographics are replacing dashboards and large reports, and information consumers love them because infographics are quick and easy to understand. Information Builders WebFOCUS Infographics offer the ability to use your existing data to build powerful, visual stories that can be personalized and bursted to millions of users.

Introducing WebFOCUS Infographics

By Rado Kotorov, Ph.D, Vice President & Chief Innovation Officer, Business Intelligence & Analytics, Information Builders

Transition from insight discovery to insight communication

---

INFOGRAPHICS are fast becoming the preferred method of delivering government, corporate, and other organizational information to large numbers of information consumers. Infographics are replacing dashboards and large reports, and information consumers love them because infographics are quick and easy to understand. Information Builders WebFOCUS Infographics offer the ability to use your existing data to build powerful, visual stories that can be personalized and bursted to millions of users.

---

The product categories and currencies are listed in the title of this infographic.

** High-performing products are identified by connectivity between brand to more products.

---

ACCESSORIES REVENUE REPORT
QUARTER 1: 2018

This infographic shows the revenue metrics for the time period and product category specified. The regional manager, therefore, can ascertain the total revenue**, the weekly earnings, and the percentile contribution of the high-performing products**.

---

MONTHLY REVENUE

TODAY'S TOP PERFORMERS

UNIVERSAL REMOTE CONTROL REVENUE

HEADPHONES 68%

CHARGERS REVENUE
The Infographics Advantage
Science provides clear evidence about the power of infographics as a communication tool and its advantages over traditional corporate presentations of data and information, such as dashboards and reports:
- 90% of information transmitted to the brain is visual.
- Visuals are known to improve learning and retention by 400%.
- Visuals are processed 60,000 times faster than text.
- People remember 80% of what they see versus only 20% of what they read.
- 65% of people are visual learners.

To sum it up, visual stories (infographics) offer an advantage that enables users to comprehend the message and reach a conclusion at a glance, which in turn allows them to remember the details easily and clearly.

Communicating information and knowledge in the form of visual stories facilitates learning, decision-making, and quick actions, which in turn leads to higher organizational alignment and performance.

How Infographics Are Elevating Business Intelligence
Infographics are enabling a Business Intelligence industry transition from insights discovery to insights communication, from showing data in dashboards and reports to communicating corporate information using stories, which are easier and faster to comprehend than charts and reports or grids. Infographics also reduce the time required to analyze and draw conclusions. For these reasons, infographics are replacing long and wordy reports with visual stories that allow you to more quickly and effectively engage information consumers—expanding the reach of traditional business intelligence.

Highly visual and aesthetically appealing, infographics are creating new expectations for information visualizations and presentations in the Business Intelligence industry.
Infographics vs. Dashboards and Reports

In today’s Business Intelligence industry, infographics are appearing on the scene in increasing numbers. Short and concise, the best infographics can relay a story (i.e., unit of information) at a glance. Conclusions are more obvious, and user comprehension is instantaneous and effortless.

By comparison:
- Dashboards are becoming boring. Users have too many dashboards that look the same. Conclusions do not jump out at you by just looking at a dashboard. Dashboards still require users to examine the data points and perform analysis.
- Users do not have the attention span to read through long reports. Similar to Twitter messages, they want to be able to quickly reach conclusions and act on the information provided.

See below for an example of a dashboard and an infographic. Which would you rather read?
The WebFOCUS Infographics Advantage
The advantage of a WebFOCUS Infographic is defined by its major attributes – design flexibility, data connection potential, automation, and distribution capability.

- **Design** – to tell your story, establish a connection with the user through unique design and aesthetics that reinforce your brand. Choose from hundreds of design templates or create your own design using the rich library of elements available to you.

- **Data Connection** – populate the infographic with data from your own corporate data sources and parametrize key elements, such as filters, etc., to dynamically change the content based on user selections.

- **Automation and Distribution** – personalize the infographic and/or distribute it to one person, a select group, or everyone in your email directory. Or burst it to millions of users.

WebFOCUS Infographics offer fully customizable, data-driven infographics in each of these areas:

- **Design** - We provide every WebFOCUS user with a connection to our partner Easel.ly, offering easy-to-use tools and a rich library of graphical elements to design amazing infographic templates.

- **Data Connection** – Using WebFOCUS InfoAssist, you can build data queries from corporate and personal data sources and connect them to the driven elements in your infographic.

- **Automation and Distribution** – Using WebFOCUS ReportCaster, the connected-to-data infographic can be generated and personalized dynamically and distributed to any number of recipients.

Find out more about our partner Easel.ly at https://www.easel.ly/.
Creating a WebFOCUS Infographic
With WebFOCUS Infographics, creating a professional infographic is easy.

Step 1. Design the Infographic Template
a. Use Easel.ly, our high-end, easy-to-use design tool that contains thousands of visual elements to design your infographic template.

b. Select from a wide variety of graphs to display data from your corporate systems.
c. After the design is complete, download the infographic template and import it into our ad hoc tools, where you can bind it to data.

Step 2. Bind to Your Data and Distribute
Next, use WebFOCUS InfoAssist to bind to your data and distribute the infographic.

a. Connect to a corporate or personal data source or file.

b. Select the chart in the template to bind to your data.

c. We display the required inputs and you build the query.

d. You can insert user-controlled parameters (e.g., filters) and schedule the infographic to be sent to any number of users with personalized information.

Try It for Yourself!
If you like what you have learned about WebFOCUS Infographics here, sign up to join our WebFOCUS Infographics focus group, where you can learn more about how to replace your dashboards and reports with powerful infographics that tell your corporate story. Join now by contacting Customer_Success@ibi.com.
The Challenge. United Way needed to help its worldwide network of 13,000 employees understand which partners have the best performance and which programs are the most successful.

The Strategy. With WebFOCUS, United Way created a self-service analytics environment to visualize data collected during large research studies, enabling local United Ways to learn from their peers, share best practices, and discover opportunities to improve.

The Results. United Way better serves 61 million people each year with targeted, relevant services, as evidenced by the successful distribution of tens of millions of dollars in aid following devastating hurricanes.

United Way Launches Global Performance Management System
Relief Efforts Maximized With WebFOCUS Self-Service Analytics for 13,000 Users in 40 Countries

The world’s largest privately funded nonprofit organization, United Way Worldwide conducts nearly a dozen worldwide studies to gauge performance and analyze outcomes in all aspects of its business, including fundraising activities, operating efficiency, and the effective utilization of human capital. The organization recently purchased WebFOCUS business intelligence (BI) and analytics software from Information Builders to support a diverse global staff with varying technical abilities.

“Some analytics products were good at data visualization, but they lacked many of the application development and data management capabilities that we needed to create a complete portal environment. Only Information Builders offered this full capability.”

Karen Brunn, Vice President of Research, United Way Worldwide
The steward of approximately $4.7 billion in annual contributions, United Way devotes a great deal of time and energy to tracking operational performance. The global human and social services organization carefully monitors all fundraising distribution activities, gathering insight to maximize the efforts of thousands of employees at 1,800 local United Way offices across the world, assisted by millions of volunteers.

“We need to know which local United Ways have the best track records, which programs are the most successful, and which initiatives have the greatest impact,” explains Lisa Bowman, Executive Vice President and Chief Marketing Officer at United Way. “We also need to know what each community needs and how well we are addressing those needs.”

Bowman and her colleagues were only able to view resulting data from their studies via tabular reports and high-level summaries. As more sophisticated analytics tools became available, United Way realized that the entire staff would be more likely to recognize patterns, dependencies, and anomalies in the data if it were presented visually through dashboards, maps, and charts. United Way carefully evaluated several marketleading analytics tools before purchasing the WebFOCUS platform from Information Builders.

United Way currently uses WebFOCUS to better track the effectiveness of its charitable activities through PerformanceLink, a self-service BI portal that empowers workers to manipulate performance data and build their own dashboards, reports, and scorecards. Employees and volunteers throughout the United Way ecosystem now access the portal to better understand the needs of the 61 million people United Way serves each year.

“Our goal is engaging our users and helping individual United Way affiliates understand key insights from our national research,” says Karen Brunn, Vice President of Research at United Way Worldwide. “Our data visualization capability, centered on WebFOCUS, helps individual United Way offices share best practices, identify opportunities for improvement, and better utilize the resources and contributions of our worldwide team. The portal makes the information easier to interpret, understand, and apply to the urgent needs of the communities we work with, all over the world.”
Analytics Transformation

The BI and analytics product United Way sought had to include built-in security to partition various data sets. It also had to be user-friendly enough to enable staff members to create customized scorecards. “Some analytics products were good at data visualization, but they lacked many of the application development and data management capabilities that we needed to create a complete portal environment,” Brunn reports. “Only Information Builders offered this full capability.”

According to Brunn, United Way selected WebFOCUS because it easily displays and organizes a large amount of performance, demographic, and socioeconomic information on digital maps, charts, graphs, and reports. WebFOCUS offers out-of-the-box components for creating dashboards and InfoApps™—user-friendly BI apps that enable non-technical users to explore data and analytics content. And WebFOCUS has comprehensive tools for data organization, integration, and governance. United Way’s business community liked WebFOCUS because it merges several layers of data onto an underlying map. Furthermore, WebFOCUS has easy-to-generate scorecards that depict variables such as volunteer involvement, investor trends, and operating efficiency.

Rapid Rollout

Today, more than 13,000 authorized users throughout United Way access the results from the national research studies through topic tabs in the PerformanceLink portal. They visualize information through dashboards as they drill down from an
entire region to an individual United Way affiliate, and use location analytics to depict the data geographically. These dynamic displays make it easy to see how each affiliate is performing relative to its peers.

Users visualize data in scatter plots. Color-coded quintile scores reveal performance by population groupings for any dimension they want to see. The portal automatically customizes data based on the location, needs, interests, and security clearances of each user.

“We are providing full access to the data from all our research studies in an engaging, interactive environment,” Brunn reports. “Users have scorecards depicting current and past performance, along with customizable dashboards that let them highlight top performers and performance drivers – all in a one-stop, easy-to-use portal.”

For example, a Peer Finder Map allows United Way affiliates to study the attributes of similar United Way locations based on population demographics, disposable income, employment status, and other variables. This insight helps individual United Ways optimize their fundraising strategies and relationship management techniques, and might one day allow managers at United Way headquarters to predict the success of upcoming campaigns.

“The individual United Ways access data on their peers, see what is working, and share ideas that boost the performance of the entire organization,” Brunn explains. “In a relatively short period of time we discovered and created powerful BI functionality that we couldn’t even have conceived of at the outset of the project.”

“Our data visualization capability, centered on WebFOCUS, helps individual United Way offices share best practices, identify opportunities for improvement, and better utilize the resources and contributions of our worldwide team. The portal makes the information easier to interpret, understand, and apply to the urgent needs of the communities we work with, all over the world.”

Karen Brunn, Vice President of Research, United Way Worldwide
**Targeted Relief**

Detecting patterns in the campaign data not only enables better-targeted and more successful fundraising initiatives, but also allows more relevant distribution of aid. United Way uses PerformanceLink to map need indicators by community against distributions to key health and human service organizations. “Our analytics technology helps us determine how best to distribute funds across the many communities we serve,” says Brunn. “Last year, we raised $54 million to provide critical support in the disastrous aftermath of hurricanes Harvey, Irma, and Maria. PerformanceLink will revolutionize how we distribute these types of funds. Digital maps depict where United Ways are operating relative to affected areas and allow us to map ‘need indicators’ against these geographies.”

Each United Way office gains a better understanding of how best to meet community needs. They discern opportunities for improvement, identify and connect with peer United Way organizations, and maximize their resources to positively impact each community. For example, some United Ways are proficient at securing grants, others at developing community impact agendas, and still others at raising money from high-net-worth donors. PerformanceLink reveals which communities contain actively engaged volunteers, helping all affiliates share insights about how to raise money and generate resources for community health.

**Big Data Analytics**

Bowman foresees creating a big data environment in the future to analyze United Way’s extensive research data in aggregate, potentially gaining insight into national health and education trends. For example, if they observe that hundreds of communities throughout the United States are experiencing similar issues with early-grade reading – which is a primary indicator for a child’s potential to graduate from high school and gain financial stability – this knowledge could engender cooperative efforts to help all schools and communities improve. “Whether the insights pertain to government programs or the private sector, our data could reveal pressing problems facing a large number of communities in the U.S.,” she explains.
Brunn and her colleagues credit the Information Builders partnership with helping to keep United Way on the forefront of innovation. “We didn’t want to just purchase an analytics platform,” she concludes. “We wanted to form a long-term relationship, where we could learn from and continually tap into the provider’s expertise. PerformanceLink gives us enterprise visibility. We’ve opened access to all our national studies and created customizable reports on every part of the portal. The data gives us a deeper understanding of where each United Way stands so they can learn from their peers, share best practices, and discover opportunities to improve.”
Learn and Connect

Product Information Centers

Information Builders product Information Centers offer a variety of resources to support your success, such as release content, how-to technical videos, search, and upgrade planning tools. You can also browse PDF files, order print documentation, or contact us to share your feedback. You can find these resources in the Technical Support Center at https://techsupport.informationbuilders.com/toc.jsp.

Education and Training

Information Builders training classes prepare our customers for the opportunities in the new connected world, empowering them to develop the needed skills and competencies for delivering world-class business applications and solutions that support ongoing growth and success. Explore your training options at http://education.informationbuilders.com.

User Groups

Information Builders User Groups offer a unique way for you to join your peers in a local venue, learn about the latest software features and innovations from Information Builders technical experts, and share your own expertise through networking at or after the event. See our schedule of Local and Virtual User Groups at https://www.informationbuilders.com/events/usergroups.

Focal Point Community

Focal Point provides customers with an opportunity to collaborate on solutions and share tips and techniques with over 10,000 members. Browse more than 26,000 topics and over 150,000 posts for answers to your questions on WebFOCUS, FOCUS, and iWay. Focal Point membership is complimentary, and it’s easy to join the Information Builders Focal Point community. Just visit the Focal Point home page and click Login/Join to create a profile at http://forums.informationbuilders.com/eve/forums.
Technical Highlights

July - September 2018

A technical publication, extending the value of our rich Focal Point community, and highlighting techniques, topics, and use cases to support your success with Information Builders software.