JDEtips

EnterpriseOne® Standard Deviation

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E1 *Editor's Note: Obscure requests can throw any developer into a bit of a panic—especially if the documentation on how to accomplish such a task is as obscure as the request itself. Such was the case for Mike Wright recently when he was asked to calculate Standard Deviation for a report in JD Edwards®. The information on how to do so was limited, if available at all, thus leaving Mike to his own devices. But conquer he did—and his solution to calculating a Standard Deviation within EnterpriseOne is presented in this article, including both a refresher on the calculation itself and the code to add this to your system, should the need arise.*

Recently, I worked on a manufacturing report that analyzed weeks of demand. The report had a calculation in it that required Standard Deviation to be used. Needless to say—this is not a usual request in JDE®. Then again, it's not totally out of the realm of possibility either.

Standard deviation is useful in situations in which you have a series of numbers. For example, if you are looking at customers and forecast demand by week or month, you might want to see the standard deviation to see how far the values are from the averages. You might have two customers with similar average sales but different deviations, indicating one might have bigger fluctuations in values. If you are analyzing average shipments per day or sales per day, you might want to see the deviation from the average. It's a really useful statistical tool that is commonly found in spreadsheets.

Getting back to the report for which I needed a solution…the goal was to determine how many days of inventory a given item would have based on the item's current on-hand balance and the average demand per day. This was to be done by calculating the average demand per week, adding in the standard deviation, then dividing by five to get the quantity per day. The standard deviation was needed to account for situations in which there were really high-demand weeks and low-demand weeks, as the average doesn't always show that fluctuation.

I didn't even think much about this request until I started trying to find a way to do standard deviation.

I started my journey by looking in the system functions, but couldn't find any help there. Then I started to search on business functions, but also couldn't find anything there. OK–maybe there is something there, but as most of you know, it can be difficult at times to find standard business functions to do exactly what you need; sometimes you get lucky and sometimes you are left with a puzzled look on your face.

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My next step was to start asking around and I ended up getting puzzled looks from other people as well. A few people said that it sounded too much like math. A few others said to do it in Excel. Because I needed to do this in EnterpriseOne, I finally came to the realization that I was on my own with this. But here's the good news—I discovered a solution that allowed me to calculate and report on standard deviations in E1. This article shows you how to set up a business function to calculate standard deviation and also explain briefly what standard deviation is (in case the last time you were required to calculate one was back in college).

I've organized the information as follows:

1) **Definition of Standard Deviation –** what does it mean, what is the formula

2) **Creation of Data Structure –** build structure to pass parameters to and from a business function

3) **Creation of Business Function –** details on how to use the standard deviation formula in event rules

Definition of Standard Deviation

Before we go any further, let's take some time to talk about a simple definition of standard deviation. The average of a set of numbers is the sum of those numbers divided by the total numbers. For example, if you had the five numbers (8, 10, 12, 14, 16) the average would be 12. (8+10+12+14+16=60). 60/5=12.

Standard Deviation is the average distance that the values are from the average. In other words, how close on the average are the values from the mean or average. The smaller the standard deviation, the closer the values are to the average. Let's take a look at the formula shown in Figure 1.
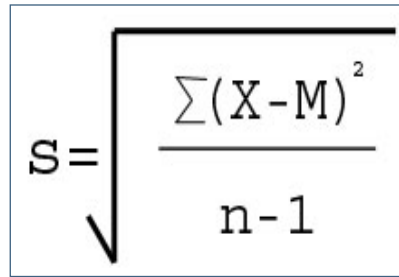
$$S = \sqrt{\frac{\sum(X-M)^2}{n-1}}$$

Figure 1: Standard Deviation Formula

Don't be intimidated by this formula. It's not as bad as it looks. Let me take you through the different letters and then break it down some more with an example.

- X = specific values in the group or set

- M = mean or average of the set of values

- n = number of values

> ### Standard Deviation is the average distance that the values are from the average.

The symbol Σ (Sigma) is a sum symbol. Let me walk through the formula in steps.

1. Calculate the average of the numbers first to get M.

2. Take each specific number and subtract the average.

3. Take that step 2 calculation each time and square it.

4. Sum the squares and divide by the total number of values minus 1.

5. Take the square root of the calculated value determined in step 4.

Let's go through an example. Taking the five numbers we used for the average example (8,10,12,14,16), here is the calculation:

Average was 12.

- 8-12=-4 Squared= 16

- 10-12=-2 Squared= 4

- 12-12=0 Squared= 0

- 14-12=2 Squared= 4

- 16-12=4 Squared= 16

Add those together, 16+4+0+4+16, to get 40. 40/4=10; the square root of 10 is 3.162

That means that all of these numbers are an average of 3.162 away from 12.

One last thing I want to mention briefly is the n-1. In this calculation, it is really sample standard deviation. If you had a complete set of numbers and wanted to calculate population standard deviation, you would use n instead of n-1. Excel uses n-1 for STDEV and n for STDEVP, if you are familiar with those functions.

Creation of Data Structure

Now we are ready to start creating EnterpriseOne objects to do our calculations. First let's create a data structure to use for parameter passes. From Object Management Workbench (OMW), click the Add button to get to the screen shown in Figure 2.

Click the Data Structure radio button and then click OK to get to the screen shown in Figure 3.

You can use whatever name you like. Just remember to use system codes 55-59 after the D because those system codes are reserved for clients and won't be impacted by upgrades or electronic software updates. I used D5598SDV. Click OK and go into Data Structure Design from the Design Tools tab to set up the parameters. Figure 4 shows the Design screen.

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