**Transaction Time Statistics (Time Tab)**

The time that a transaction spends being processed can be categorized as either working, waiting for resource time, blocked time, or inactive time.

* **Work Time** (Tot Work, Avg Work, Stdev Work, Min Work, and Max Work))-The amount of time work is actively being performed on transactions. Calculated from activity task duration times.
* **Resource Wait Time** (Tot Res Wait, Avg Res Wait, Stdev Res Wait, Min Res Wait, Max Res Wait)-The amount of time transactions are waiting for a resource.
* **Blocked Time** (Tot Block, Avg Block, Stdev Block, Min Block, Max Block)-The amount of time transactions are blocked at activities. A block can occur due to conditions delaying processing of the transaction (for example, transactions are collected by time or by gate, during a Delay duration or the activity reaches a capacity limit on the Task page). Blocked time does not include any time spent waiting for a resource.
* **Inactive Time** (Tot Inact, Avg Inact, Stdev Inact, Min Inact, Max Inact)-The time a transaction spends at an activity waiting because the necessary resources or the activity are not in schedule (that is, inactive).
* **Cycle Time** (Tot Cycle, Avg Cycle, Stdev Cycle, Min Cycle, and Max Cycle)-The amount of time, or simulated `wall-clock' time, that transactions were in activities. Also known as Lead Time. Includes Work Time and Wait Time.

The cycle time calculation depends on whether the model uses compressed or calendar time. For more information, see [Simulation Run Setup](mk:@MSITStore:C:\Program%20Files%20(x86)\iGrafx\Pro\15.0\1033\flow.chm::/16_definingthesimulationenvironment3.html#1019039).

For example, using **calendar time mode**, a car (transaction) enters an Automobile Repair Center at 4:00 pm. It takes two hours to complete the transaction, but the mechanic leaves at 5:00 pm and comes back in at 8:00 am. Also, the mechanic is busy with other things until 9:00 am. The cycle time, therefore, is eighteen hours (two hours working, one hour waiting for resource and 15 hours inactive).

* **Service Time** (Tot Serv, Avg Serv, Stdev Serv, Min Serv, and Max Serv)-The actual amount of time that the transaction is being processed. This is a combination of working time, waiting for resource time, and blocked time, but not inactive time.

For example, in the Automobile Repair Center example, the service time is three hours (two hours working and one hour waiting).

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| --- | --- |
|  | In a **compressed time model**, cycle time and service time are the same thing. |

* **Waiting Time** (Tot Wait, Avg Wait, Stdev Wait, Min Wait, and Max Wait)-The time transactions spend waiting. This includes inactive time, blocked time, and resource wait time.  
    
  Tot Wait = Tot Res Wait + Tot Block + Tot Inact  
    
  For example, in the Automobile Repair Center example, the waiting time is 16 hours (one hour waiting for resource and 15 hours inactive time).
* **Service Waiting Time** (Tot Serv Wait, Avg Serv Wait, Stdev Serv Wait, Min Serv Wait, and Max Serv Wait)-The time that the transaction waited while being processed (not inactive).  
    
  Tot Serv Wait = Tot Res Wait + Tot Block  
    
  For example, in the Automobile Repair Center example, the service waiting time is one hour (one hour waiting for resource).

## Activity Formulas

* **Total** (Tot)  
    
  For time or cost statistics, the total is the sum of time or costs accumulated by the transactions that have completed for each activity. For count statistics, the total is the number of transactions that have been counted at each activity. If you apply a filter to the statistic, then only specific completed transactions are counted.
* **Average** (Avg or Tavg)  
    
  For time or cost statistics, the average (Avg) is the total time or costs divided by the number of completed transactions for each activity. For count statistics, the two types of average are Avg and Tavg.
  + Avg is the observation-based average. This is the sum of the value of the statistic, when observed, divided by the number of observations taken.
  + Tavg is the time-weighted average. This is the average after weighting each count based on the amount of time that the observed count occurred.

For example, consider a simulation model where one transaction waits for an hour, and another transaction arrives after that hour and waits for 15 minutes before both transactions are processed at the elapsed 1.25 hours. The average **(Avg) wait count** is 1 observed waiting, plus 2 observed waiting, divided by the 2 observations, for an average of 1.5. Written as an equation, this is (1 + 2)/2 = 1.5. When we consider the **time-weighted average (Tavg)** wait count, we have 1 waiting for 1.25 hours, plus 1 waiting for 0.25 hours, divided by the total time of 1.25 hours, for an average of 1.2. Written as an equation, this is (1.25 + 0.25)/1.25 = 1.2.

For the count statistics average, iGrafx recommends that you use the time-weighted average (Tavg) when it is available.

* **Standard Deviation** (Stdev or TStdev)The magnitude of the statistic deviation from the average.
* **Maximum** (Max)  
    
  The highest number accumulated for the statistic at any one point in time (the "high-water mark").
* **Minimum** (Min)  
    
  The lowest number accumulated for the statistic at any one point in time.
* **Final Value (Final)**  
    
  The value of the statistic at report time (when simulation ends).

Table 2Comparison of time executions of activities in days with Excel and iGrafx

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Minimum**  **Cycle Time** | **Average Cycle Time** | **Maximum**  **Cycle Time** | **Average Work** | **Average**  **Wait** |
| **Spreadsheet** | 14,10625 | 4,10625 | 8,10625 | 1,361805556 | 2,744444 |
| **iGrafx** | **7,93** | **12,05** | **15,04** | **1,36** | **10,85** |

**Transaction Statistics (Days)**

**Count Avg Cycle Avg Work Avg Wait Avg Res Wait Min Cycle Max Cycle**

**10 13,05 1,38 11,67 12,08 11,04 15,04**

* **Cycle Time** (Tot Cycle, Avg Cycle, Stdev Cycle, Min Cycle, and Max Cycle)-The amount of time, or simulated `wall-clock' time, that transactions were in activities. Also known as Lead Time. Includes Work Time and Wait Time.

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The cycle time calculation depends on whether the model uses compressed or calendar time. For more information, see [Simulation Run Setup](mk:@MSITStore:C:\Program%20Files%20(x86)\iGrafx\Pro\15.0\1033\flow.chm::/16_definingthesimulationenvironment3.html#1019039).

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**RESULTS**

**DISCUSSION**

**REFERENCES**