CALCULATIONS

Based on the above assumptions of COCOMO parameters, we can map the effort multiplier ratings into the effort multiplier chart. Each selected value is highlighted and the effort multiplier value is shown in the rightmost column. This exercise is performed for each of the builds and platforms.

Build 0

SUN Effort Multipliers

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Attributes** | **Very Low** | **Low** | **Nominal** | **High** | **Very High** | **Extra High** | **Multiplier** |
| RELY | 0.75 | 0.88 | 1 | 1.15 | 1.4 |  | 1 |
| DATA |  | 0.94 | 1 | 1.08 | 1.16 |  | 1.08 |
| CPLX | 0.7 | 0.85 | 1 | 1.15 | 1.3 | 1.65 | 1 |
| TIME |  |  | 1 | 1.11 | 1.3 | 1.66 | 1 |
| STOR |  |  | 1 | 1.06 | 1.21 | 1.56 | 1 |
| VIRT |  | 0.87 | 1 | 1.15 | 1.3 |  | 1.15 |
| TURN |  | 0.87 | 1 | 1.07 | 1.15 |  | 0.87 |
| ACAP | 1.46 | 1.19 | 1 | 0.86 | 0.71 |  | 1.19 |
| AEXP | 1.29 | 1.13 | 1 | 0.91 | 0.82 |  | 1 |
| PCAP | 1.42 | 1.17 | 1 | 0.86 | 0.7 |  | 1.17 |
| VEXP | 1.21 | 1.1 | 1 | 0.9 |  |  | 1 |
| LEXP | 1.14 | 1.07 | 1 | 0.95 |  |  | 0.95 |
| MODP | 1.24 | 1.1 | 1 | 0.91 | 0.82 |  | 0.91 |
| TOOL | 1.24 | 1.1 | 1 | 0.91 | 0.83 |  | 1 |
| SCED | 1.23 | 1.08 | 1 | 1.04 | 1.1 |  | 1 |
| Multiplier |  |  |  |  |  |  | 1.30 |

*Table 7: Sun Build 0 Effort Multipliers*

PC Effort Multipliers

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Attributes** | **Very Low** | **Low** | **Nominal** | **High** | **Very High** | **Extra High** | **Multiplier** |
| RELY | 0.75 | 0.88 | 1 | 1.15 | 1.4 |  | 1 |
| DATA |  | 0.94 | 1 | 1.08 | 1.16 |  | 0.94 |
| CPLX | 0.7 | 0.85 | 1 | 1.15 | 1.3 | 1.65 | 0.85 |
| TIME |  |  | 1 | 1.11 | 1.3 | 1.66 | 1 |
| STOR |  |  | 1 | 1.06 | 1.21 | 1.56 | 1 |
| VIRT |  | 0.87 | 1 | 1.15 | 1.3 |  | 1.15 |
| TURN |  | 0.87 | 1 | 1.07 | 1.15 |  | 0.87 |
| ACAP | 1.46 | 1.19 | 1 | 0.86 | 0.71 |  | 1 |
| AEXP | 1.29 | 1.13 | 1 | 0.91 | 0.82 |  | 1 |
| PCAP | 1.42 | 1.17 | 1 | 0.86 | 0.7 |  | 1 |
| VEXP | 1.21 | 1.1 | 1 | 0.9 |  |  | 1 |
| LEXP | 1.14 | 1.07 | 1 | 0.95 |  |  | 0.95 |
| MODP | 1.24 | 1.1 | 1 | 0.91 | 0.82 |  | 0.91 |
| TOOL | 1.24 | 1.1 | 1 | 0.91 | 0.83 |  | 1 |
| SCED | 1.23 | 1.08 | 1 | 1.04 | 1.1 |  | 1 |
| Multiplier |  |  |  |  |  |  | 0.69 |

*Table 8: PC Build 0 Effort Multipliers*

Build 1

SUN Effort Multipliers

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Attributes** | **Very Low** | **Low** | **Nominal** | **High** | **Very High** | **Extra High** | **Multiplier** |
| RELY | 0.75 | 0.88 | 1 | 1.15 | 1.4 |  | 1 |
| DATA |  | 0.94 | 1 | 1.08 | 1.16 |  | 1.08 |
| CPLX | 0.7 | 0.85 | 1 | 1.15 | 1.3 | 1.65 | 1 |
| TIME |  |  | 1 | 1.11 | 1.3 | 1.66 | 1 |
| STOR |  |  | 1 | 1.06 | 1.21 | 1.56 | 1 |
| VIRT |  | 0.87 | 1 | 1.15 | 1.3 |  | 1 |
| TURN |  | 0.87 | 1 | 1.07 | 1.15 |  | 0.87 |
| ACAP | 1.46 | 1.19 | 1 | 0.86 | 0.71 |  | 1.19 |
| AEXP | 1.29 | 1.13 | 1 | 0.91 | 0.82 |  | 1 |
| PCAP | 1.42 | 1.17 | 1 | 0.86 | 0.7 |  | 1.17 |
| VEXP | 1.21 | 1.1 | 1 | 0.9 |  |  | 1 |
| LEXP | 1.14 | 1.07 | 1 | 0.95 |  |  | 0.95 |
| MODP | 1.24 | 1.1 | 1 | 0.91 | 0.82 |  | 0.91 |
| TOOL | 1.24 | 1.1 | 1 | 0.91 | 0.83 |  | 1 |
| SCED | 1.23 | 1.08 | 1 | 1.04 | 1.1 |  | 1 |
| Multiplier |  |  |  |  |  |  | 1.13 |

*Table 9: Sun Build 1 Effort Multipliers*

PC Effort Multipliers

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Attributes** | **Very Low** | **Low** | **Nominal** | **High** | **Very High** | **Extra High** | **Multiplier** |
| RELY | 0.75 | 0.88 | 1 | 1.15 | 1.4 |  | 0.88 |
| DATA |  | 0.94 | 1 | 1.08 | 1.16 |  | 0.94 |
| CPLX | 0.7 | 0.85 | 1 | 1.15 | 1.3 | 1.65 | 0.85 |
| TIME |  |  | 1 | 1.11 | 1.3 | 1.66 | 1 |
| STOR |  |  | 1 | 1.06 | 1.21 | 1.56 | 1 |
| VIRT |  | 0.87 | 1 | 1.15 | 1.3 |  | 1 |
| TURN |  | 0.87 | 1 | 1.07 | 1.15 |  | 0.87 |
| ACAP | 1.46 | 1.19 | 1 | 0.86 | 0.71 |  | 1 |
| AEXP | 1.29 | 1.13 | 1 | 0.91 | 0.82 |  | 1 |
| PCAP | 1.42 | 1.17 | 1 | 0.86 | 0.7 |  | 1 |
| VEXP | 1.21 | 1.1 | 1 | 0.9 |  |  | 1 |
| LEXP | 1.14 | 1.07 | 1 | 0.95 |  |  | 0.95 |
| MODP | 1.24 | 1.1 | 1 | 0.91 | 0.82 |  | 0.91 |
| TOOL | 1.24 | 1.1 | 1 | 0.91 | 0.83 |  | 1 |
| SCED | 1.23 | 1.08 | 1 | 1.04 | 1.1 |  | 1 |
| Multiplier |  |  |  |  |  |  | 0.53 |

*Table 10: PC Build 1 Effort Multipliers*

Build 2

SUN Effort Multipliers

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Attributes** | **Very Low** | **Low** | **Nominal** | **High** | **Very High** | **Extra High** | **Multiplier** |
| RELY | 0.75 | 0.88 | 1 | 1.15 | 1.4 |  | 1 |
| DATA |  | 0.94 | 1 | 1.08 | 1.16 |  | 1.16 |
| CPLX | 0.7 | 0.85 | 1 | 1.15 | 1.3 | 1.65 | 1 |
| TIME |  |  | 1 | 1.11 | 1.3 | 1.66 | 1 |
| STOR |  |  | 1 | 1.06 | 1.21 | 1.56 | 1 |
| VIRT |  | 0.87 | 1 | 1.15 | 1.3 |  | 1 |
| TURN |  | 0.87 | 1 | 1.07 | 1.15 |  | 0.87 |
| ACAP | 1.46 | 1.19 | 1 | 0.86 | 0.71 |  | 1 |
| AEXP | 1.29 | 1.13 | 1 | 0.91 | 0.82 |  | 0.91 |
| PCAP | 1.42 | 1.17 | 1 | 0.86 | 0.7 |  | 1 |
| VEXP | 1.21 | 1.1 | 1 | 0.9 |  |  | 1 |
| LEXP | 1.14 | 1.07 | 1 | 0.95 |  |  | 0.95 |
| MODP | 1.24 | 1.1 | 1 | 0.91 | 0.82 |  | 0.91 |
| TOOL | 1.24 | 1.1 | 1 | 0.91 | 0.83 |  | 1 |
| SCED | 1.23 | 1.08 | 1 | 1.04 | 1.1 |  | 1 |
| Multiplier |  |  |  |  |  |  | 0.79 |

*Table 11: Sun Build 2 Effort Multipliers*

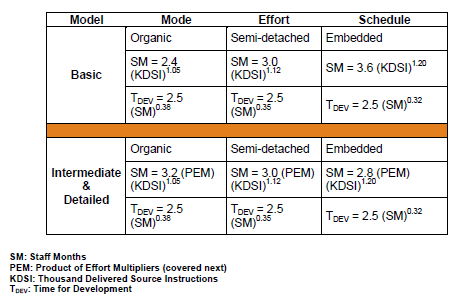
PC Effort Multipliers

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Attributes** | **Very Low** | **Low** | **Nominal** | **High** | **Very High** | **Extra High** | **Multiplier** |
| RELY | 0.75 | 0.88 | 1 | 1.15 | 1.4 |  | 0.88 |
| DATA |  | 0.94 | 1 | 1.08 | 1.16 |  | 0.94 |
| CPLX | 0.7 | 0.85 | 1 | 1.15 | 1.3 | 1.65 | 1 |
| TIME |  |  | 1 | 1.11 | 1.3 | 1.66 | 1 |
| STOR |  |  | 1 | 1.06 | 1.21 | 1.56 | 1 |
| VIRT |  | 0.87 | 1 | 1.15 | 1.3 |  | 1 |
| TURN |  | 0.87 | 1 | 1.07 | 1.15 |  | 0.87 |
| ACAP | 1.46 | 1.19 | 1 | 0.86 | 0.71 |  | 0.86 |
| AEXP | 1.29 | 1.13 | 1 | 0.91 | 0.82 |  | 0.91 |
| PCAP | 1.42 | 1.17 | 1 | 0.86 | 0.7 |  | 0.86 |
| VEXP | 1.21 | 1.1 | 1 | 0.9 |  |  | 1 |
| LEXP | 1.14 | 1.07 | 1 | 0.95 |  |  | 0.95 |
| MODP | 1.24 | 1.1 | 1 | 0.91 | 0.82 |  | 0.91 |
| TOOL | 1.24 | 1.1 | 1 | 0.91 | 0.83 |  | 1 |
| SCED | 1.23 | 1.08 | 1 | 1.04 | 1.1 |  | 1 |
| Multiplier |  |  |  |  |  |  | 0.42 |

*Table 12: PC Build 2 Effort Multipliers*

To get the total effort multiplier rating for each of the builds and platforms we can simply take the product of each effort multiplier rating. We can use this effort multiplier rating to compute staff months and time to develop for each of the three builds and two platforms.

As discussed in the above sections, we are using the organic development model and we are using the detailed model for each of the three builds. We can consult the following lookup table to determine the equations to use for the staff months and time for development, as well as the average staffing for the duration of each build.



*Table 13: Equation lookup table*

Using the organic model and the detailed equations we see that we can use the following two equations to compute staff months and development time. The equation for computing the average staffing is trivial, but is shown below as well.

The only remaining item to collect is the lines of code to write for each of the builds and platforms. We can take each of the tasks provided in the case study and sum the lines of code for each task into a total lines of code for each build. This information was also collected in the SDP. The total lines of code for each build and platform is shown in the table below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Build | 0 | | 1 | | 2 | |
| Package | Sun | PC | Sun | PC | Sun | PC |
| LOC's | 6500 | 4500 | 9500 | 3700 | 4000 | 3800 |

*Table 14: Summary of lines of code to be delivered for each build*

With the above information we can compute the number of staff months, the time to develop, and the average staffing for each of the builds. The results for each of the builds are shown in the below table:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Build | 0 | | 1 | | 2 | |
| Package | Sun | PC | Sun | PC | Sun | PC |
| SM | 29.71 | 10.73 | 38.48 | 6.68 | 10.89 | 5.44 |
| Tdev | 9.07 | 6.16 | 10.01 | 5.15 | 6.19 | 4.76 |
| Avg. Staff | 3.28 | 1.74 | 3.84 | 1.30 | 1.76 | 1.14 |

*Table 15: Tabulated results for staff months, development time and average staffing*