

### **In the beginning...**

The author's interest in task estimation dates back to the late 1980s when he started to record the observations that were to form the basis of SPECTRE. From November 1993 to the end of 1997, while was working full-time with IBM, SPECTRE was brought from prototype status to a full working version. IBM's management was kind enough to provide a series of test-cases which allowed the method's algorithms to be refined to the point where it was consistently out-performing its author's own best efforts. This period also saw a major expansion of its range of Processing Features.

The first versions of SPECTRE were based on estimating Source Lines Of Code (SLOC) based on functional content, and the following table shows how SPECTRE performed with the final set of test cases. The 7<sup>th</sup> and 8<sup>th</sup> programs in the table were specifically selected to test its ability to handle tasks at both ends of the size spectrum. The 9<sup>th</sup> and 10<sup>th</sup> were also used to test development effort estimation, where 22 days were predicted for both against actual values of 23 and 25 days.

*SPECTRE test cases*

<b>Test Case programs</b>	<b>SLOC Estimated</b>	<b>SLOC Actual</b>	<b>Deviation %</b>
<b>1</b>	1287	1338	-3.9
<b>2</b>	4715	4848	-2.8
<b>3</b>	5684	5695	-4.7
<b>4</b>	1560	1551	+0.6
<b>5</b>	11280	10776	+4.6
<b>6</b>	5520	5963	-7.5
<b>7</b>	540	634	-14.8
<b>8</b>	11424	12590	-10.0
<b>9</b>	2277	2342	-2.8
<b>10</b>	4175	4080	+2.3

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### **Construction Points**

It took a while for the penny to drop, but David quite soon realised that the situation was somewhat paradoxical: SLOC were being used as the basis for effort calculation, but if that very effort calculation was being performed anyway to derive a SLOC value, then clearly SLOC itself was a redundant metric; the best that could be said was that it might be of incidental interest. Furthermore, stylistic variations within individual 3GLs, compounded by the development of newer programming languages, meant that there could no longer be a generally accepted definition of SLOC and it therefore had little intrinsic worth for effort estimation purposes. SLOC was therefore abandoned as a meaningful metric.

In-depth analysis of the programs listed above allowed the effort calculation to be fine-tuned in the light of what seemed to be a comprehensive set of basic functions. The validity of this approach was established as far as possible by reference, in particular, to those programs for which evidence of their actual development times could be determined from either historical records or personal recollection, and the metric was dubbed Construction Point Analysis.

The author's subsequent professional experience of using SPECTRE in various estimation scenarios has enabled Construction Point Analysis to be refined to the stage where it now performs accurately and consistently across a wide variety of programming languages. In practice, results to within +/- 15% of estimate can reasonably be expected for resource deployment and control purposes.