NeoMycelium: A software reference architecture for big data systems

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Abstract. Roughly 10 years ago, the big data (BD) revolution began when the volume, velocity, and variety of data completely overwhelmed the systems used to store, manipulate and analyze that data. As a result, a new class of software systems emerged called BD systems. While many attempted to harness the power of these new systems, it is estimated that approximately 75% of the BD projects have failed within the last decade.
This paper aims to facilitate big data (BD) system development by introducing a software reference architecture, NeoMycelium. The work provides an event driven microservices architecture that addresses specific limitations in current BD reference architectures (RA). The artefact development has followed the principles of empirically grounded RAs. The RA has been evaluated by developing a prototype that solves a real-world problem in practice.
BD describes large amounts of data that comes in different forms through various channels. Increasingly, users are the ceaseless generators of structured, semi-structured, and unstructured data that if gathered and processed effectively, and efficiently, will reveal game-changing patterns. While opportunities exist with BD, the unprecedented amount of data creates bottlenecks in traditional data management approaches, and the growth of data is outpacing technological and scientific advances in data analytics. Furthermore, it is estimated that approximately 75% of the BD projects have failed within the last decade, therefore to improve success rates, well guided system development and software engineering are pivotal and references architectures are key.

Keywords: First keyword · Second keyword · Another keyword.

1 First Section

1.1 A Subsection Sample

Please note that the first paragraph of a section or subsection is not indented. The first paragraph that follows a table, figure, equation etc. does not need an indent, either.

Subsequent paragraphs, however, are indented.

Sample Heading (Third Level) Only two levels of headings should be numbered. Lower level headings remain unnumbered; they are formatted as run-in headings.

Sample Heading (Fourth Level) The contribution should contain no more than four levels of headings. Table 1 gives a summary of all heading levels.

Table 1. Table captions should be placed above the tables.

Heading level	Example	Font size and style
Title (centered)	**Lecture Notes**	14 point, bold
1st-level heading	**1 Introduction**	12 point, bold
2nd-level heading	**2.1 Printing Area**	10 point, bold
3rd-level heading	**Run-in Heading in Bold.** Text follows	10 point, bold
4th-level heading	*Lowest Level Heading.* Text follows	10 point, italic

Displayed equations are centered and set on a separate line.

$$x + y = z \tag{1}$$

Please try to avoid rasterized images for line-art diagrams and schemas. Whenever possible, use vector graphics instead (see Fig. 1).

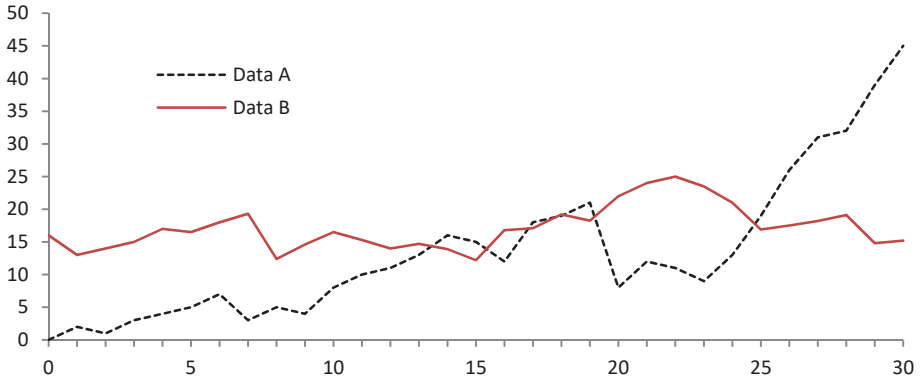

Fig. 1. A figure caption is always placed below the illustration. Please note that short captions are centered, while long ones are justified by the macro package automatically.

Theorem 1. *This is a sample theorem. The run-in heading is set in bold, while the following text appears in italics. Definitions, lemmas, propositions, and corollaries are styled the same way.*

Proof. Proofs, examples, and remarks have the initial word in italics, while the following text appears in normal font.

For citations of references, we prefer the use of square brackets and consecutive numbers. Citations using labels or the author/year convention are also acceptable. The following bibliography provides a sample reference list with entries for journal articles [1], an LNCS chapter [2], a book [3], proceedings without editors [4], and a homepage [5]. Multiple citations are grouped [1–3], [1, 3–5].

References

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