Modernização de Sistemas Legados para Disponibilização em Dispositivos Móveis com Arquitetura Baseada em *microservices*

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Abstract. The universal use of mobile computing devices, especially smartphones, is undeniable and an irreversible process. This fact encourages the organizations using information systems to adapt them to provide an adequate access through this computational tool, providing a good experience of use besides taking advantage of new possibilities inherent to these devices. Legacy systems, however, can make this adaptation difficult, either because of its technology, inappropriate code coupling or architecture, since the technology at the time of its development lags behind with time, demanding the modernization of its architecture. In this context, the microservices architecture has been emerging. This work proposes a modernization process of legacy systems to a microservice-based architecture, distributing the system into several small independent services, each focused on a single task and communicating through messages. This distribution and independence will leave each service independent to use any technology, breaking the technological constraints of the legacy system in addition to facilitating future evolutions. However, this separation of the system, can be time-consuming because of the need to understand the business rules implemented and the necessary refactorings. In order to prioritize the availability of mobile access to these systems, the proposed process provides an intermediate step of modernization using the REST Wrapping technique.

Resumo. O uso universal de dispositivos móveis computacionais, especialmente dos smartphones, é incontestável e um processo sem volta. Este fato impulsiona as organizações possuidoras de sistemas de informação a adaptá-los para um adequado acesso através deste veículo computacional, proporcionando uma boa experiência de uso além de aproveitar novas possibilidades inerentes a estes dispositivos. Os sistemas legados, no entanto, podem dificultar esta adaptação, seja por sua tecnologia, acoplamento de código ou arquitetura inapropriados, uma vez que a tecnologia à época de seu desenvolvimento ficou defasada com o passar do tempo, demandando uma modernização de sua arquitetura. Neste contexto, a arquitetura de microservices tem se destacado. Este trabalho propõe um processo de modernização de sistemas legados para uma arquitetura baseada em microservices, distribuindo o sistema em diversos serviços pequenos, independentes entre si, focados cada um em uma única

tarefa e comunicando-se por mensagens. Esta distribuição e independência deixarão cada serviço livre para utilizar qualquer tecnologia, quebrando as amarras tecnológicas do sistema legado, além de facilitar futuras evoluções. Esta ?quebra? do sistema, no entanto, pode ser demorada, em virtude da necessidade de entendimento das regras de negócio implementadas e dos refatoramentos necessários. Em virtude disto, para priorizar a disponibilização do acesso mobile a estes sistemas, o processo proposto prevê uma etapa intermediária de modernização utilizando a técnica de REST Wrapping.

1. General Information

All full papers and posters (short papers) submitted to some SBC conference, including any supporting documents, should be written in English or in Portuguese. The format paper should be A4 with single column, 3.5 cm for upper margin, 2.5 cm for bottom margin and 3.0 cm for lateral margins, without headers or footers. The main font must be Times, 12 point nominal size, with 6 points of space before each paragraph. Page numbers must be suppressed.

Full papers must respect the page limits defined by the conference. Conferences that publish just abstracts ask for **one**-page texts.

2. First Page

The first page must display the paper title, the name and address of the authors, the abstract in English and "resumo" in Portuguese ("resumos" are required only for papers written in Portuguese). The title must be centered over the whole page, in 16 point boldface font and with 12 points of space before itself. Author names must be centered in 12 point font, bold, all of them disposed in the same line, separated by commas and with 12 points of space after the title. Addresses must be centered in 12 point font, also with 12 points of space after the authors' names. E-mail addresses should be written using font Courier New, 10 point nominal size, with 6 points of space before and 6 points of space after.

The abstract and "resumo" (if is the case) must be in 12 point Times font, indented 0.8cm on both sides. The word **Abstract** and **Resumo**, should be written in boldface and must precede the text.

3. CD-ROMs and Printed Proceedings

In some conferences, the papers are published on CD-ROM while only the abstract is published in the printed Proceedings. In this case, authors are invited to prepare two final versions of the paper. One, complete, to be published on the CD and the other, containing only the first page, with abstract and "resumo" (for papers in Portuguese).

4. Sections and Paragraphs

Section titles must be in boldface, 13pt, flush left. There should be an extra 12 pt of space before each title. Section numbering is optional. The first paragraph of each section should not be indented, while the first lines of subsequent paragraphs should be indented by 1.27 cm.

4.1. Subsections

The subsection titles must be in boldface, 12pt, flush left.

5. Figures and Captions

Figure and table captions should be centered if less than one line (Figure 1), otherwise justified and indented by 0.8cm on both margins, as shown in Figure 2. The caption font must be Helvetica, 10 point, boldface, with 6 points of space before and after each caption.
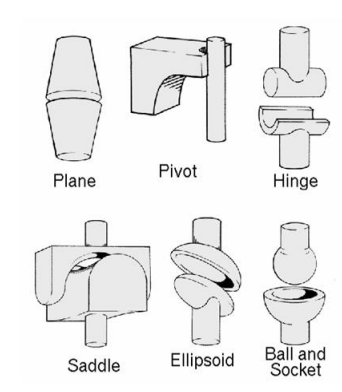

Figure 1. A typical figure

Figure 2. This figure is an example of a figure caption taking more than one line and justified considering margins mentioned in Section 5.

In tables, try to avoid the use of colored or shaded backgrounds, and avoid thick, doubled, or unnecessary framing lines. When reporting empirical data, do not use more decimal digits than warranted by their precision and reproducibility. Table caption must be placed before the table (see Table 1) and the font used must also be Helvetica, 10 point, boldface, with 6 points of space before and after each caption.

Table 1. Variables to be considered on the evaluation of interaction techniques

	Chessboard top view	Chessboard perspective view
Selection with side movements	6.02 ± 5.22	7.01 ± 6.84
Selection with in-depth movements	6.29 ± 4.99	12.22 ± 11.33
Manipulation with side movements	4.66 ± 4.94	3.47 ± 2.20
Manipulation with in-depth movements	5.71 ± 4.55	5.37 ± 3.28

6. Images

All images and illustrations should be in black-and-white, or gray tones, excepting for the papers that will be electronically available (on CD-ROMs, internet, etc.). The image resolution on paper should be about 600 dpi for black-and-white images, and 150-300 dpi for grayscale images. Do not include images with excessive resolution, as they may take hours to print, without any visible difference in the result.

7. References

Bibliographic references must be unambiguous and uniform. We recommend giving the author names references in brackets, e.g. [Knuth 1984], [Boulic and Renault 1991], and [Smith and Jones 1999].

The references must be listed using 12 point font size, with 6 points of space before each reference. The first line of each reference should not be indented, while the subsequent should be indented by 0.5 cm.

References

Boulic, R. and Renault, O. (1991). 3d hierarchies for animation. In Magnenat-Thalmann, N. and Thalmann, D., editors, *New Trends in Animation and Visualization*. John Wiley & Sons ltd.

Knuth, D. E. (1984). *The TEX Book*. Addison-Wesley, 15th edition.

Smith, A. and Jones, B. (1999). On the complexity of computing. In Smith-Jones, A. B., editor, *Advances in Computer Science*, pages 555–566. Publishing Press.