Universidade do Minho
Escola de Engenharia

Plano de Trabalho de Dissertação

Ano Letivo 2020/2021

Nome Estudante	Bruno Manuel Chaves Martins
Título da Dissertação (em Português)	*IoT* como um serviço baseado na *cloud*
Título da Dissertação (em Inglês)	Cloud based *IoT* as service

Enquadramento e Motivação (150 - 200 palavras)

Internet of Things (*IoT*) is the expression that describes the interconnectivity of objects and sensors to the internet in order to create a grid of devices that collect, share and, in some cases, actuate in the environment to provide a better surrounding[1]. These types of technologies are already deeply ingrained in our society, from smart home appliances to sensors spread all around cities to track many society metrics. The growth of the use of these technologies is exposing many challenges still open in the realm of what types of technologies to utilize, what is the best architecture to apply in each scenario[5] and the repercussions on deployment and on non functional requirements.

Software as a Service or *SaaS* is a somewhat old concept but widely spreaded nowadays. It consists of a company producing its own services and software to provide to a customer for a fee. These end to end solutions usually are provided via a web to the client and nowadays represent a large part of the market cap in *IT*. It is projected that *IoT* as a service will grow to the extent as software as a service has become.
Cloud computing is a major pillar of SaaS strategies because only with a robust infrastructure companies are able to provide a service with the level of quality that is needed nowadays.

The integrations of *IoT* and the Cloud is a challenge in itself, although the cloud allows an elastic runtime infrastructure, self-service and offers fine grained *IoT* resources when systems scale, a whole new array of problems need to be addressed such as configuring new resources when they need to be added and how to scale down in off-peak times[1]. IoT and Cloud are very different types of technologies in a sense that *IoT* is characterised by many distributed devices with limited computing abilities and storage and Cloud computing is described as a network with close to unlimited storage capabilities and processing capabilities[2].

Objetivos e Resultados Esperados (150 - 200 palavras)

In the realm of smart rooms there is a mostly unexplored side of informing people about the state of rooms. The objectives of this study is, in the first stages, to research, evaluate different kinds of approaches to *IoT* and *SaaS* based on the cloud in various contexts and utilize this study to implement an end to end cloud based *IoT* as a Service system utilizing sensors that are as minimal intrusive as possible in workspaces, all of this on a smart room that can be a coworking space or a library study room to name some examples. Currently are being considered *ESP 32* boards and noise decibel sensors to perform the work.

The cloud is going to represent a major part of the work in order to remove computing stress from the sensors and move the major processing part to dedicated servers that can perform those actions with very low cost[4]. One other key part of the system is the conceptualization of an adequate architecture that can respond to the non functional requirements that are going to be proposed as well as finding the correct patterns of communication between the sensor layer of the system and the application layer.

Calendarização

Task	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Collect state of the art	X	X	X							
Study architectural styles		X	X							
Analyze communication protocols		X	X							
Write Pre-dissertation report		X	X	X						
Implement proof of concept				X	X	X	X	X		
Testing and Benchmarking					X	X	X	X		
Scientific Dissemination						X	X	X		
Dissertation						X	X	X	X	X

Referências Bibliográficas (5 - 10 referências)

[1] Asir, Reuban & Manohar, Hansa & Anandraj, Wilson & Sivaranjani, K. (2016). IoT as a Service. International Conference on Innovations in information, Embedded and Communication Systems (ICIIECS).

[2] H. F. Atlam, A. Alenezi, A. Alharthi, R. J. Walters and G. B. Wills, "Integration of Cloud Computing with Internet of Things: Challenges and Open Issues," 2017 IEEE International Conference on Internet of Things (iThings) and IEEE Green Computing and Communications (GreenCom) and IEEE Cyber, Physical and Social Computing (CPSCom) and IEEE Smart Data (SmartData), Exeter, 2017, pp. 670-675, doi: 10.1109/iThings-GreenCom-CPSCom-SmartData.2017.105.

[3] Bissi, Wilson & Neto, Adolfo & Emer, Maria. (2016). The Effects of Test Driven Development on Internal Quality, External Quality and Productivity: A systematic review. Information and Software Technology. 74. 10.1016/j.infsof.2016.02.004.

[4] V. C. Emeakaroha, N. Cafferkey, P. Healy and J. P. Morrison, "A Cloud-Based IoT Data Gathering and Processing Platform," 2015 3rd International Conference on Future Internet of Things and Cloud, Rome, 2015, pp. 50-57, doi: 10.1109/FiCloud.2015.53.

[5] Naveen, Soumyalatha. (2016). Study of IoT: Understanding IoT Architecture, Applications, Issues and Challenges.

Assinaturas

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Orientado

Diretor do Ciclo de Estudos

Coorientador (se aplicável)

Assinatura digital qualificada com Cartão de Cidadão ou Chave Móvel Digital. Para os estudantes, nos casos em que tal não seja possível, os mesmos deverão imprimir este plano, assinar manualmente e, após digitalização, os restantes intervenientes usam a assinatura digital qualificada.