

# What is the difference between functional and non-functional requirements? [closed]

Asked 11 years, 7 months ago   Modified 20 days ago   Viewed 874k times



313



**Closed.** This question needs to be more [focused](#). It is not currently accepting answers.



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Closed 7 years ago.

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What is the difference between **functional** and **non-functional** requirements in the context of designing a software system?

Give examples for each case.

requirements

system-requirements

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edited Jan 23, 2021 at 20:52



Dbercules

719 ● 1 ● 12 ● 26

asked May 10, 2013 at 5:48



Omid7

3,194 ● 5 ● 16 ● 12

@TravisJ Again, let's keep the tag on questions until we are done with the first phase of tag burnination. – [TylerH](#) Feb 17, 2017 at 21:39

6 Answers

Sorted by:

Highest score (default)



566

A functional requirement describes *what* a software system should do, while non-functional requirements place constraints on *how* the system will do so.



Let me elaborate.



An example of a **functional requirement** would be:



- A system must send an email whenever a certain condition is met (e.g. an order is placed, a customer signs up, etc).



A related **non-functional requirement** for the system may be:

- Emails should be sent with a latency of no greater than 12 hours from such an activity.

The functional requirement is **describing the behavior of the system** as it relates to the system's functionality.

The non-functional requirement **elaborates a performance characteristic** of the system.

Typically non-functional requirements fall into areas such as:

- Accessibility
- Capacity, current and forecast
- Compliance
- Documentation
- Disaster recovery
- Efficiency
- Effectiveness
- Extensibility
- Fault tolerance
- Interoperability
- Maintainability
- Privacy
- Portability
- Quality
- Reliability
- Resilience
- Response time
- Robustness
- Scalability

- Security
- Stability
- Supportability
- Testability

A more complete list is available at Wikipedia's entry for [non-functional requirements](#).

Non-functional requirements are sometimes defined in terms of metrics (i.e. something that can be measured about the system) to make them more tangible. Non-functional requirements may also describe aspects of the system that don't relate to its execution, but rather to its evolution over time (e.g. maintainability, extensibility, documentation, etc.).

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edited Jan 4, 2019 at 18:40



auxbuss

509 ● 1 ● 5 ● 20

answered May 10, 2013 at 5:52



LBushkin

132k ● 33 ● 217 ● 265

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I'll defer to you of course given your reputation and professional work history (which I looked at before writing this): couldn't your *non-functional requirement* example be considered a behavior? Or is your point more to the fact that non-functional requirements describe constraints around behaviors? – Thomas Feb 1, 2019 at 16:15

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- 1 To clarify my question a bit (and it may not be answerable): is there a way to better elucidate the boundary of what

constitutes behavior? – [Thomas](#) Feb 1, 2019 at 16:19

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plus 1 for giving nice example of email system. :) – [Ahtisham](#)  
Feb 22, 2019 at 6:15

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35



functional requirements are the main things that the user expects from the software for example if the application is a banking application that application should be able to create a new account, update the account, delete an account, etc. functional requirements are detailed and are specified in the system design

Non-functional requirement are not straight forward the requirement of the system rather it is related to usability( in some way ) for example for a banking application a major non-functional requirement will be available the application should be available 24/7 with no downtime if possible.

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edited Nov 4, 2019 at 16:26



[NickS](#)

[NickS](#) 84 ● 10

answered May 10, 2013 at 5:59



[pulasthi](#)

1,750 ● 1 ● 17 ● 29



33

## Functional requirements

1. Functional requirements specifies a function that a system or system component must be able to



perform. It can be documented in various ways. The most common ones are written descriptions in documents, and use cases.

2. Use cases can be textual enumeration lists as well as diagrams, describing user actions. Each use case illustrates behavioural scenarios through one or more functional requirements. Often, though, an analyst will begin by eliciting a set of use cases, from which the analyst can derive the functional requirements that must be implemented to allow a user to perform each use case.
3. Functional requirements is what a system is **supposed to accomplish**. It may be
  - Calculations
  - Technical details
  - Data manipulation
  - Data processing
  - Other specific functionality
4. A typical functional requirement will contain a unique name and number, a brief summary, and a rationale. This information is used to help the reader understand why the requirement is needed, and to track the requirement through the development of the system.

## Non-functional requirements

[LBushkin](#) have already explained more about Non-functional requirements. I will add more.

1. Non-functional requirements are any other requirement than functional requirements. This are the requirements that specifies criteria that can be used to **judge the operation of a system, rather than specific behaviours**.
2. Non-functional requirements are in the form of "**system shall be** ", an overall property of the system as a whole or of a particular aspect and not a specific function. The system's overall properties commonly mark the difference between whether the development project has succeeded or failed.
3. Non-functional requirements - can be divided into two main categories:
  - **Execution qualities**, such as security and usability, which are observable at run time.
  - **Evolution qualities**, such as testability, maintainability, extensibility and scalability, which are embodied in the static structure of the software system.
4. Non-functional requirements place restrictions on the product being developed, the development process, and specify external constraints that the product must meet.
5. The [IEEE-Std 830 - 1993](#) lists 13 non-functional requirements to be included in a Software Requirements Document.

- 
1. Performance requirements
  2. Interface requirements
  3. Operational requirements
  4. Resource requirements
  5. Verification requirements
  6. Acceptance requirements
  7. Documentation requirements
  8. Security requirements
  9. Portability requirements
  10. Quality requirements
  11. Reliability requirements
  12. Maintainability requirements
  13. Safety requirements

Whether or not a requirement is expressed as a functional or a non-functional requirement may depend:

- on the level of detail to be included in the requirements document
- the degree of trust which exists between a system customer and a system developer.

Ex. A system may be required to present the user with a display of the number of records in a database. This is a functional requirement. How up-to-date [update] this number needs to be, is a non-functional requirement. If



the number needs to be updated in real time, the system architects must ensure that the system is capable of updating the [displayed] record count within an acceptably short interval of the number of records changing.

References:

1. [Functional requirement](#)
2. [Non-functional requirement](#)
3. [Quantification and Traceability of Requirements](#)

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edited May 23, 2017 at 11:54

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Community Bot

1 • 1

answered Aug 31, 2016 at 9:40



Somnath Muluk

57.5k • 38 • 224 • 228

- 
- 1 Nice answer with good references. I want only to add the more updated standard, since IEEE 830-1993 was superseded. Most recent standard is ISO/IEC/IEEE 29148:2018 "Systems and software engineering -- Life cycle processes -- Requirements engineering" ([iso.org/standard/72089.html](https://iso.org/standard/72089.html)) – logoff Jul 26, 2019 at 13:20
- 



Functional requirements are those which are related to the technical functionality of the system.



non-functional requirement is a requirement that specifies criteria that can be used to judge the operation of a system in particular conditions, rather than specific behaviors.

For example if you consider a shopping site, adding items to cart, browsing different items, applying offers and deals and successfully placing orders comes under functional requirements.

Whereas performance of the system in peak hours, time taken for the system to retrieve data from DB, security of the user data, ability of the system to handle if large number of users login comes under non functional requirements.

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edited Nov 30 at 12:26



DPM

2,030 ● 3 ● 28 ● 49

answered Aug 31, 2016 at 10:12



Maruthi Sikhakolli

590 ● 3 ● 10 ● 24

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Excellent answer. – [lftekhar](#) Jan 26, 2019 at 5:23

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3

**FUNCTIONAL REQUIREMENTS** the activities the system must perform

- business uses functions the users carry out



- use cases example if you are developing a payroll system required functions
- generate electronic fund transfers
- calculation commission amounts
- calculate payroll taxes
- report tax deduction to the IRS



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answered Sep 10, 2013 at 11:28

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ABDUL

39 ● 1



2



I think *functional requirement* is from client to developer side that is regarding functionality to the user by the software and *non-functional requirement* is from developer to client i.e. the requirement is not given by client but it is provided by developer to run the system smoothly e.g. safety, security, flexibility, scalability, availability, etc.



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edited Jun 24, 2014 at 10:58

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tashuhka

5,116 ● 4 ● 49 ● 67

answered Jun 24, 2014 at 10:28



Rajnor D S

21 ● 2



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