

# Software Functionality Specifications

## 1. General Product Requirements

### 1.1. Technical Requirements

ID	Description	Critical	Yes/No
1.1.0 1	The product is created in a seminal development environment. The development environment is...? <i>Eclipse, Eric4, Console</i>	<input checked="" type="checkbox"/>	<b>Yes (1)</b>
1.1.0 2	Data storage is done in a relational database only. <b>Type: PostgreSQL from EnterpriseDB</b>	<input checked="" type="checkbox"/>	Yes
1.1.0 3	The integration of the clients is possible in via the following: a. Client - Server <input checked="" type="checkbox"/> b. Terminal client <input type="checkbox"/> c. Web-Client <input checked="" type="checkbox"/>	<input type="checkbox"/>	<b>Yes (2)</b>
1.1.0 4	The integration of an electronic archive and direct call of the archived documents in the HIS is possible.	<input checked="" type="checkbox"/>	<b>Yes</b>
1.1.0 5	Connection to other systems possible? E. g. HL7	<input checked="" type="checkbox"/>	<b>Yes (3)</b>
1.1.0 6	Which Operating Systems are supported by the system? <i>Windows XP, Windows 7, Windows 8</i> <i>Debian-Linux, Ubuntu, Redhat Enterprise Linux, SUSE Enterprise Linux and many more</i> <i>MacOSX</i>	<input type="checkbox"/>	

## 1.2. Ergonomic Requirements

ID	Description	Critical	Yes/No Date
1.2.01	The support centre in charge for the hospital is located in: <b>Location:</b>	<input type="checkbox"/>	(4)
1.2.02	Support will be available for the following times: ..... .....	<input type="checkbox"/>	(5)
1.2.03	Local support of users will be done with the following remote assistance tools: <i>e.g. Teamviewer</i>	<input type="checkbox"/>	
1.2.04	All masks are equipped with a meaningful help function. Help should be provided in a way that a user trained in his area of work must be able use the system without being trained individually.	<input type="checkbox"/>	Yes
1.2.05	The size of all masks should adapt to the screen size available.	<input type="checkbox"/>	Yes

## 1.3. Requirements on data protection and IT-security

ID	Description	Critical	Yes/No Date
1.3.01	The HIS supports, in cooperation with the database system, an encrypted storage of patient data.	<input checked="" type="checkbox"/>	(6)
1.3.02	User actions are recorded. Every action is unambiguously connected to a user.	<input checked="" type="checkbox"/>	Yes
1.3.03	Patient data is accessible based on the status of the patient. (e.g. the data is locked for general editing as soon as the patient is dismissed).	<input checked="" type="checkbox"/>	No (7)
1.3.04	It's possible to create a password directive.	<input type="checkbox"/>	Yes
1.3.05	Every user can change his password individually.	<input type="checkbox"/>	No (8)

ID	Description	Critical	Yes/No/Date
1.3.06	The authorisation concept for program calls and for changes and deletion of data are documented by the system.	<input type="checkbox"/>	Yes
1.3.07	It is possible to create a data backup while the system is still online.	<input type="checkbox"/>	Yes

## 2. Technical requirements

### 2.1. structure of modules

ID	Description	Critical	Yes/No/Date
2.1.01	Central address administration for all modules	<input checked="" type="checkbox"/>	?
2.1.02	Patient administration	<input checked="" type="checkbox"/>	Yes
2.1.03	Reservation management	<input checked="" type="checkbox"/>	No
2.1.04	Billing system	<input checked="" type="checkbox"/>	Yes (9)
2.1.05	Medical documentation	<input checked="" type="checkbox"/>	Yes
2.1.06	Laboratory system	<input type="checkbox"/>	Yes
2.1.07	Integration of MS-Office, <i>Support for OpenOffice/LibreOffice</i>	<input checked="" type="checkbox"/>	No/ Yes
2.1.08	System for rental of durable medical equipment	<input type="checkbox"/>	No
2.1.09	Interfaces to, for example, radiology	<input type="checkbox"/>	Yes (10)

## 2.2. Functional requirements

ID	Description	Critical	Yes/No Date
2.2.01	<b>Patient administration - master data:</b>	<input checked="" type="checkbox"/>	Yes
2.2.02	General hospital data	<input type="checkbox"/>	Yes
2.2.03	Cost payer with several contact persons Complete address Possible to print out the records	<input checked="" type="checkbox"/>	Yes
2.2.04	Doctors Complete address Specialist divisions Possible to print out the records	<input checked="" type="checkbox"/>	Yes
2.2.05	Clinics Complete address Possible to print out the records	<input checked="" type="checkbox"/>	No (11)
2.2.06	Diagnoses ICD 10 and OPS - possible to change diagnoses texts	<input checked="" type="checkbox"/>	Yes
2.2.07	Referrer Complete address Possible to print out the records	<input type="checkbox"/>	No
2.2.08	Additional addresses Complete address, including specification (e.g. nursing home) Possible to print out the records	<input type="checkbox"/>	Yes
2.2.09	Administration of holidays, for use in reservation system	<input type="checkbox"/>	No
2.2.10	Billing master data: daily prices, lump sums, additional articles course and validity periods	<input checked="" type="checkbox"/>	No Yes (12)
2.2.11	DRG grouping master data, performances and special rates course and validity periods	<input checked="" type="checkbox"/>	No
2.2.12	billing numbers in different ranges	<input type="checkbox"/>	No
2.2.13	Impersonal accounts and cost centres	<input type="checkbox"/>	No
2.2.14	Master data for beds, wards and bed categories	<input type="checkbox"/>	No
2.2.15	Definition of additional data for the reservation system, that is shown as information	<input type="checkbox"/>	No
2.2.16	Administration of templates for MS-Word and MS-Excel	<input type="checkbox"/>	Yes
2.2.17	Designation of mandatory fields in the main patient mask without limitation of or interference in workflows.	<input type="checkbox"/>	Yes
2.3.01	<b>Patient administration - <i>Patient's data</i>:</b>		
2.3.02	Patient master data: Name, address, date of birth, insurance number, etc.	<input checked="" type="checkbox"/>	Yes
2.3.03	Stays: arrival, dismissal and planned dismissal	<input checked="" type="checkbox"/>	Partly
2.3.04	Administration of several interruption of stay, which can be	<input checked="" type="checkbox"/>	No

ID	Description	Critical	Yes/No Date
	used for reporting and billing later		
2.03.05	Possible assignment of at least 3 cost payers per stay	<input checked="" type="checkbox"/>	No
2.03.06	Diagnoses: discrimination between transferring, arrival, continuous and dismissal diagnoses, with operation codes	<input checked="" type="checkbox"/>	No
2.03.07	Relatives, with address	<input type="checkbox"/>	Yes
2.03.08	Legal guardians	<input type="checkbox"/>	Yes
2.03.09	Information on cost assurance	<input type="checkbox"/>	No
2.03.10	Cost splitting between cost payers	<input type="checkbox"/>	No
2.03.11	Recording of changes in patient's data	<input checked="" type="checkbox"/>	Yes
2.03.12	Drop-down filters for use in reporting	<input type="checkbox"/>	No (13)
2.03.13	Data transferred by cost payers, import to the system	<input type="checkbox"/>	No
2.03.14	Fusion of patient cases	<input checked="" type="checkbox"/>	Yes
2.03.15	Distinction between inpatients and outpatients	<input checked="" type="checkbox"/>	No
2.03.16	Fields for general data	<input type="checkbox"/>	Yes
2.03.17	Search for patients via name, phone number, room number, insurance number, etc.	<input type="checkbox"/>	Yes
2.03.18	The patient administration should include drop-down fields that are free to use, and to be maintained and filled by the hospital. Examples for contents would be: - inpatient, outpatient, company - information for serial letters - individual notes and tags -	<input type="checkbox"/>	Yes
2.4.01	<b>Patient administration - reservation system:</b>		No
2.04.02	Fully graphical interface	<input checked="" type="checkbox"/>	No

ID	Description	Critical	Yes/No Date
2.04.03	Administration of camp beds	<input type="checkbox"/>	No
2.04.04	Bed characteristics are assigned via master data. Ability to search for beds in the reservation system via characteristics.	<input type="checkbox"/>	No
2.04.05	Filter for wards and rooms.	<input type="checkbox"/>	No
2.04.06	Reservation via bed categories; overview of available beds per category	<input checked="" type="checkbox"/>	No
2.04.07	Interruptions of stays are shown	<input checked="" type="checkbox"/>	No
2.04.08	Additional information to the patient, like wheelchair or blind, have to be shown in the reservation system	<input type="checkbox"/>	No
2.04.09	Several room transfers per stay possible, and shown in the reservation system.	<input checked="" type="checkbox"/>	No
2.04.10	Free choice of colors for gender, care level or reservation status	<input type="checkbox"/>	No
2.04.11	Clipboard for transfers etc.	<input type="checkbox"/>	No
2.05.01	<b>Patient administration - billing:</b>		
2.05.02	Billing of individual articles	<input checked="" type="checkbox"/>	Yes
2.05.03	Billing with up to 4 different invoice recipients with individual accounts, e.g. additional insurances	<input checked="" type="checkbox"/>	Yes
2.05.04	Taxes	<input type="checkbox"/>	Yes
2.05.05	Billing of daily prices, with automatic booking	<input checked="" type="checkbox"/>	No
2.05.06	Free booking of co-payments	<input type="checkbox"/>	No
2.05.07	Lump sums, automatic conversion into daily prices if requirements are not met	<input type="checkbox"/>	No
2.05.08	Billing of DRGs	<input checked="" type="checkbox"/>	No
2.05.09	One or several patients in one bill	<input checked="" type="checkbox"/>	No
2.05.1	Rules for billing	<input checked="" type="checkbox"/>	No

ID	Description	Critical	Yes/No Date
0			
2.05.11	Interim billing	<input type="checkbox"/>	No
2.05.12	Subsequent billing	<input checked="" type="checkbox"/>	No
2.05.13	Administration of advance payments	<input type="checkbox"/>	No
2.05.14	Several layouts for invoice printouts, possible to choose while printing	<input type="checkbox"/>	Yes
2.05.15	Possibility of cancellation of invoices	<input checked="" type="checkbox"/>	Yes
2.05.16	Possible to print master copies of invoices	<input checked="" type="checkbox"/>	No
2.05.17	Interface to a financial accounting software	<input type="checkbox"/>	Yes
2.05.18	sequential invoice numbers	<input checked="" type="checkbox"/>	No
2.05.19	Possible to print pro-forma invoices	<input type="checkbox"/>	Yes
2.05.20	Accounts receivable ledger	<input checked="" type="checkbox"/>	No
2.05.21	Several prices per article	<input type="checkbox"/>	No
2.06.01	<b>Patient administration - reporting:</b>		
2.06.02	Possible to create lists and queries and include them into the system	<input type="checkbox"/>	Yes
2.06.03	Online to-do lists for administrative purposes	<input type="checkbox"/>	Yes
2.06.04	Online checklists, e.g. for billing or data completion	<input type="checkbox"/>	No
2.06.05	Possible to create standard lists/reports with a report generator in the system (e.g. arrival lists, dismissal lists, serial letters, info letters)	<input checked="" type="checkbox"/>	Yes
<b>2.07.01</b>	<b>Patient administration - statistics:</b>		

ID	Description	Critical	Yes/No Date
2.07.02	Overview on reservation and capacity utilization Possible to filter the overview with patient's data	<input checked="" type="checkbox"/>	Yes
2.07.03	Reports on arrivals and dismissals	<input type="checkbox"/>	No
2.07.04	Reports on length of stay, with filters on cost payer and other filters	<input type="checkbox"/>	No
2.07.05	Reports on business volumes	<input type="checkbox"/>	No
2.07.06	Reports on in-house performances, related to patients (e.g. care duties, therapeutic performances, etc)	<input type="checkbox"/>	No
2.07.07	Referrer statistics	<input type="checkbox"/>	No
2.07.08	Excel-Pivot lists for individual reporting	<input checked="" type="checkbox"/>	No
2.07.09	SQL-based reporting system for individual reporting	<input checked="" type="checkbox"/>	Yes
2.07.10	Reports should be possible on free periods of time, and accurate down to a day. This includes, but is not restricted to: - Reservation by cost payers - Hit list of for example hospitals and doctors - Reservation status reports - Year-to-year and month-to-month comparisons - Care level statistics - Arrival/Dismissal statistics - Age statistics	<input checked="" type="checkbox"/>	Yes
3.01	<b>Medical Documentation:</b>	<input checked="" type="checkbox"/>	
3.01.01	Recording of performances (e.g. care duty, therapeutic performances, etc.), based on self-defined master data	<input type="checkbox"/>	Yes
3.01.02	Import of (diagnostic) finding reports via scanner and electronic archive	<input checked="" type="checkbox"/>	Yes
3.01.03	Change documentation based on a filing structure created by the hospital	<input checked="" type="checkbox"/>	Yes
3.01.04	MS-Word-templates with online connection to the database <i>Possible for OpenOffice/LibreOffice</i>	<input checked="" type="checkbox"/>	No Yes
3.01.05	Rights system on templates and documents, including but not limited to locking of documents	<input checked="" type="checkbox"/>	Yes
3.01.06	System to relay documents to different persons/departments within the hospital. Protocol on whom the document was	<input type="checkbox"/>	No



ID	Description	Critical	Yes/No Date
	relayed to.		
3.01.07	Possible to add, change and adapt ICD's.	<input checked="" type="checkbox"/>	Yes
3.01.08	Possible to use a list of medicaments, with the ability to search for medicaments, synonyms and generics.	<input checked="" type="checkbox"/>	Yes (14)
4.01	<b>Laboratory system</b>	<input checked="" type="checkbox"/>	
4.01.01	Electronic processing of laboratory results via HL7 and LDT	<input checked="" type="checkbox"/>	Yes
4.01.02	Creation of a cumulated laboratory status	<input checked="" type="checkbox"/>	Yes
4.01.03	Individual critical values based on gender and age	<input checked="" type="checkbox"/>	Yes
4.01.04	Possible to sort and rank results individually.	<input type="checkbox"/>	Yes

## 6. Users

The hospital wants to use the system with 60 clients.

*Untested but not a problem for GNUmed based on e.g. Debian-Linux and PostgreSQL9.x with automatic replication and failover.*

### **Rights of use system:**

- The system shall allow a differentiated setup of right of use.  
(Describe the rights of use system in your software.)

*GNUmed uses a role-based rights system. Access rights to the application (including parts thereof) are bound to roles such as physician, nurse, front-desk-staff etc. This is handled at the database level.*

### **Hardware - server:**

- Microsoft SQL Server 2008 R2 64-Bit

*Not possible with GNUmed. PostgreSQL is the only choice without serious changes to GNUmed.*

- Microsoft Terminal Server 2008 64-Bit

*Not tested but should work in principle.*

### **Software environment terminal-server:**

- Microsoft Word  
- Microsoft Excel

*LibreOffice Writer and Calc are recommended instead.*

- (1) A development environment is not strictly necessary since GNUmed uses python as programming language. Almost every modern IDE can be used (Eclipse, Eric4, MS Visual Studio)
- (2) Default is Client-Server. A web-client prototype exists and would be highly interesting addition. A highly trained programmer is available to lead the conversion. Options are numerous. Prototype is done in python. Other prototype is done in JAVA. Using Javascript should be no problem at all.
- (3) We have implemented XML-RPC connections and GDT/BDT-based interaction. HL7 is not yet available but technically only a matter of the code. It is definitely possible. We interact with e.g Dicom-Viewer Gingko-CADx and Osirix (Mac only) as well as LibreOffice/OpenOffice. Additionally GNUmed provides a slave mode which lets 3rd party apps control GNUmed.
- (4) That would be your company I assume. We would offer support for your company
- (5) We offer around the clock support via mailing-lists or chat. No formal fixed support hours are in place.

- (6) Traffic between client and server is encrypted. Database itself is not (yet) encrypted. Databases should be stored on encrypted filesystems as well as hardware-encrypted harddrives.  
<http://www.postgresql.org/docs/9.1/static/encryption-options.html>
- (7) There is not yet the concept of inpatient vs. outpatient. Therefore no record is locked after "discharge from hospital". This is a highly unusual request and is usually covered by audit trails.
- (8) Changing passwords for a user is not yet possible from inside the GNUmed client application. Adding new users is possible. Password change option would need to be added.
- (9) This is highly unspecific. Billing very much depends on Albanian laws and regulations. Billing is supported in principle but no specific to Albania.
- (10) This is highly unspecific. Connectivity to GinkgoCadx (Metaemotion) and Osirix (MacOS only) exist. DCM4CHEE is recommended for radiology PACS.
- (11) GNUmed does not have clinics and wards explicitly modelled out. It is possible but needs coding.
- (12) GNUmed does not include modules for hospital grade billing and inventory management. However GNUmed has close ties to the billing/account software Ledger-SMB which should and could be contracted to produce the missing features.
- (13) A dedicated reporting solution such as Talend Studio or JasperReports should be used. It could query the GNUmed database directly.
- (14) GNUmed interfaces to FreeDiams software