



TECHNICAL DOCUMENT

Draft:

“Strengthening the technical and technological capabilities of the Public Health Network of the Department of Valle del Cauca”

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December 20, 2017

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1. INTRODUCTION

The Colombian State joins efforts in order to guarantee the fulfillment of the designated mission in relation to the development of information systems, which are not compatible with each other, making access to information difficult and, therefore, making it less efficient. public administration. Thus guarantee the flow proper information and the interaction between them is one objective crucial in the implementation of tools that facilitate access to information records clinicians in different Company Social State that make up the public network to to allow the systems of information incompatible to communicate properly. In this way, contribute to the fulfillment of other national level guidelines, related to the articulation of collective and individual activities, with a population and differential approach , strengthen the primary provider the operation in integral services networks and therefore the bridge between social security and System of Health.

Thus, taking into account the competencies defined by the norm and the situational diagnosis in relation to the technological component, it presents an important degree of obsolescence in the social enterprises of the State of the Department of Valle del Cauca, a situation that combined with the lack of interaction information between providers, generates high costs in the provision of the services of health by the use of non - cash thereof, resulting in difficulties in the quality of delivery of the same.

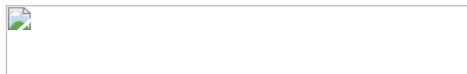
The project "Strengthening the technical and technological capabilities of the Public Health Network Department of the Valley of the Cauca" which is proposed aimed to reduce the gaps existing in terms of fragmentation of the e interruption clinical data in the provision of health services, and whose main objective is to *provide the institutions of the public health network of the capabilities needed to facilitate the access of records clinical electronic in form*

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efficient, safe, consensual and timely, through technical and technological strengthening in the providers of services of health, so which is a condition necessary to improve quality in providing services to citizens.

This document then constitutes the technical support of the project presented by the CAUCA VALLEY Government before the General Royalty System, complying with the requirements established in Title II, Chapter I, Article 4 Agreement No. 038 of 2016.

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two. CONTRIBUTION TO PUBLIC POLICY

INTERNATIONAL CONTEXT

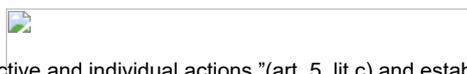
The World Health Organization (WHO), through a resolution at its 66th World Assembly, called on its member countries to adopt standards for the effective exchange of information between actors in health systems. WHO recognizes **e-Health as the cost-effective** and safe use of ICTs in the field of health and its related domains, including health care services, health surveillance and documentation, as well as the education, knowledge and research in health. Among the main points of the aforementioned resolution on interoperability, it includes demanding a standardization of e-Health among member countries, developing policies and legislation for the effective adoption of these standards, promoting collaboration with international standardization agencies and adopting measures for innovation, development and evaluation in this domain.¹

NATIONAL CONTEXT

In this context, it is necessary to mention the Law 1753 of 2015 (Law Enacting of the Health) which regulated the guarantee to the right to health, regulation and protection mechanisms; it combines the content of the fundamental right to health and constitutes an opportunity to reorient the priorities of the System. That Law made a crucial turn when he placed the right to health in the context of the health system and not of the Social Security System in Health, recognized the character of fundamental social rights and defined plus the formulation and adoption of "policies that propitiate by the promotion of the health, prevention and care of the illness and rehabilitation of their

¹ Document: Review of interoperability standards for e-Health in Latin America and the Caribbean- WHO and PAHO

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sequels, through collective and individual actions."(art. 5, lit c) and established in art. 6th. The principles that also highlight the universality and fairness of law.^{two}

On the other hand , the Law of the Development Plan 2014 - 2018 returns under the Statutory Health Act, where it is set to achieve its goals, five strategies transverse to contribute to the three pillars of the peace, the equality and the education, they are :

1) Strategic Competitiveness and Infrastructure ;

- 2) Social Mobility ;
- 3) Field Transformation ;
- 4) Security, Justice and Democracy for Peacebuilding; and,
- 5) Good Government.

Among these strategies is the of Mobility Social which describes in detail how to achieve the social objectives of the National Development Plan, and together with the competitiveness strategy and infrastructure strategic focus on the Education and the Health, are essential considering that large pillars of the Plan are eminently social.

Consequently, Art 45. Establishes the "Standards, models and guidelines of information and communications technologies for citizen service", which contribute to the improvement of the procedures and services offered by the state; optimizing the management, access, use and appropriation of ICT.

Article 65 of the 2014-2018 Development Plan, states the definition of a Policy of Integral Health Care. This policy seeks to define the bases that allow action

² COUNTRY- Comprehensive Health Care Policy.

coordinated rules, regulations, agents and users to the actions and interventions with timely intervention and effective system in solving the problems individual that do not allow or affect the gains in health of the Colombian population.

2.1. Relevance Development Plans

to. Plan National of Development 2014-2018 "All for one new country" (Public Health)

This Plan incorporates the plans of each of the social and economic sectors, which are articulated through eight programmatic axes (four vertical and four transversal). A vertical axis is that of Health, which has, among other objectives, to guarantee access to health services, to ensure better quality and a greater opportunity in health care, to make more efficient the management of networks providing health services. services, train the human talent corresponding to the area, have available and timely information for decision-making, and implement and develop the technological infrastructure necessary to provide an adequate health service to Colombians, through the use of ICT.

In this regard , the National Development Plan defines the fundamental guidelines for the development of the information in the industry health and it expressed thus: " To promote the effective enjoyment of the fundamental right to health of citizens, it also means having a system that meets with the demands and needs of unified, timely and citizen-centered information, to facilitate access to services and citizen participation through virtual channels and support the development of public health and social protection policies, among others. " ³

³ Technical guidelines Information requirements of the Integral Health Care Model - MIAS

On the other hand, the Statutory Law (1751 of 2015), the Comprehensive Health Care Policy

- COUNTRY (Resolution 429 of 2016), have as main objective to focus health action on people, at the individual, family and collective level; It should be noted that it has a strategic framework and an operational framework, the latter corresponds to the Comprehensive Health Care Model - IMAS. The model through which it is intended to define the management of the provision of health services, a situation that has required development of organization and articulation in favor of the functionality of the supply and demand of services, in conditions of accessibility, continuity, integrity, quality and resoluteness, strengthening the concept of Network of Providers of services of Health, which seeks to address problems of fragmentation, fragmentation and disruption in the provision of services, and quality of information. The model has ten operational components that start from the knowledge and characterization of the population, ending in research, innovation and appropriation of knowledge.

Given all of the above, it is considered that this project is aimed at achieving the following goals of the National Development Plan:

- a. Public hospitals that adopted some of the specific measures to improve their operation.
- b. Projects of physical infrastructure or endowment of the Social Companies of the Co-financed State .

Illustration 1: Goals of the National Development Plan - Social Mobility Strategy



Source: National Planning Department

b. National Development Plan 2014-2018 "All for a new country" (ICT Sector.)

In the Plan National of Development "All for one new country" 2014-2018: the information technology and communications (ICT) play a leading role, as a more competitive country requires not only more productive firms, but also a State More efficient and accessible. In that sense, ICTs become the best ally for interaction with citizens and achieving the social goals of the national government. Additionally, the ICTs allow to dynamize and make the State's work more transparent, provide it with more precise information to support decision-making and to better focus the offer of social programs; and it is that ICTs are one of the means to reach the vulnerable population or to remote territories that have historically not had a strong state presence .

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The Plan Nacional of Technologies of the Information and Communications has as one of its goals "in 2019 all Colombians are connected and informed, making efficient and productive use of ICT" in this sense for the health sector is seen as objective "to achieve high levels of quality and coverage of health services, based on the installation of technological infrastructure and the appropriation and effective use of ICT in the sector".

PLAN	STRATEGY CROSS	OBJECTIVE	PROGRAM
2014-2018 ALL FOR A NEW COUNTRY	1054 - SOCIAL MOBILITY	10545 - Improve the health conditions of the Colombian population and promote the effective enjoyment of the right to health, in conditions of quality, efficiency, equity and sustainability	1999- Strengthening of the management and direction of the health and social protection sector

c. Departmental Development Plan

Finally, the 2016-2019 Development Plan "THE VALLEY IS IN YOU" has the strategic objective of the "Equity and fight against poverty" pillar to reduce the Department's multidimensional poverty and social gaps, improving the conditions of well-being and development of the different population groups with the offer of health goods, services, education, infrastructure and habitat, preferential attention to early childhood, childhood, adolescence and youth and a comprehensive social management, based on equal opportunities, differential approach, rights guarantee for all Vallecaucanos.

In accordance with the policies and guidelines established by the national government in the National Development Plan 2014-2018, the departmental government defined the Territorial Health Plan (PTS) of Valle del Cauca; It is as well as this PTS expects to consolidate in the short and medium term, the required joint in the Health and Social Protection sector so that the Ministry, its agencies, member institutions and affiliated and related areas functional, it appropriated to through the the formulation, the

eleven

implementation, monitoring, evaluation and necessary adjustments to their own institutional plans, programs and projects.

The National Development Plan 2014 -2018, establishes the need to work on mechanisms of intervention that allow contribute to the consolidation of alternatives which foster compliance with regulatory targets for the provision of health services; where the articulation of the actors is an important reference in the consolidation of these guidelines and the territorial entity plays a preponderant role given its legal competences. Therefore, this Departmental Government joins efforts among its dependencies in order to contribute to the improvement of the aforementioned

situation, which constitutes a great opportunity for the health sector in Valle del Cauca, which has always required to be technologically strengthened .

Thus the activities and products of this project will directly support the implementation of the actions and the goals set at the level of public policy, Plan Nacional of Development Plans Sectorial Plan of Development of the Valley of the Cauca, in which appears as one goal shared between the Secretariat Department of Health and the Ministry of ICT.

PLAN	TRANSVERSAL STRATEGY	PROGRAM
2016-2019 THE VALLEY IS IN YOU	1 EQUITY AND FIGHT AGAINST POVERTY 101 HEALTHY VALLEY	10103 Health Authority

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3. PROBLEM DESCRIPTION

to. ICT SECTOR CONTEXT :

Currently most technology users demand applications and basic content, mainly focused on entertainment and communications, which has one low contribution to the productivity of the country; This is evidenced in the low expense that the country makes in software and applications, for every dollar spent in the country only one tenth of a cent corresponds to these products, while for other countries this ratio reaches two tenths. ⁴

Given that any project related to technological solutions must be consistent with the guidelines that respect has issued the ICT Ministry, quoted excerpts from the document "Services Digital Basic" of the Directorate of Government Online (2016) where a description is made very successful about the problem generated in the public sector :

"At present, in Colombia the entities function as information silos, that is to say, each one offers its services and procedures individually, although sometimes it requires obtaining or consulting the information of another entity; and it is precisely the citizens who end up connecting the processes of the entities when going from one to another to manage procedures and services.

The conservation and management of the information and documents that people from public entities receive or that they require to relate to them in physical formats leads to the loss of documents, their deterioration, inability to

⁴ Bases of the National Development Plan "All for a new country" 2016-2019

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have them on time and the need to copy or request them whenever you need them. To the above is added the fact that people do not have all their information in their possession and it is almost difficult for a citizen to have direct access to all the data of their medical history, and in many cases to access it you must make a request each entity of health. As if this were not enough, the dispersion of the same information of people, services, procedures and documents in different entities and databases, with different criteria and standards, generates risks in the treatment of information, hinders its administration and custody " .

The information systems of the different entities of the Colombian State are not always compatible with each other, which hinders access to information and triggers a series of events that disrupt the efficient use of information in public administration.

"This means that there is still inefficiency, poor timing and poor coordination of data and information between entities giving place to which each entity design, develop and offer its own procedures and services, digital individually and in isolation, asking citizens provide the same documents over and over again, duplicating efforts and generating heterogeneous and generally inconsistent information without taking into account the needs of integration and interaction with services, platforms and information systems of other entities, which in turn has generated in citizens a feeling of dissatisfaction, for the loss of time and the resources used to move to the different entities to collect the necessary information and to carry out their procedures and services. No less important is the inconsistency of statistics and results obtained from the management of state entities when it does not act in an integrated manner and it is unknown what data is produced and where. As a conclusion end, the difficulty of the people to validate their identity and access to the services of the State, the risk of being supplanted, the large volume of documents and information that must handle and the difficulty

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to guard and dispersion of efforts and investments in information systems by the entities, the costs associated with physical delivery of documents and notices, the risks and difficulties in the exchange of the information and the increasing of services various non-interconnected digital platforms give rise to the need and opportunity to transform and massify access to information and services of the State through an integrated scheme of basic digital services that allows the relationship between the people with a Colombian State that functions as a single institution. "

In addition and in spite of the efforts constant of the government, persist barriers and inequities real and effective users access health services that ultimately translate into gaps in care and health outcomes. The above in a scenario of resources limited, both financial, and technological and human, facing all health systems in the world.

For which the State Colombian operate as one single institution efficient that you provide to its citizens information timely, procedures agile and better services, the public authorities **must be connected and operate in a manner articulated** as a single large system.

b. CONTEXT OF THE HEALTH SECTOR IN THE DEPARTMENT:

The Department of Valle del Cauca through the Department of Health Secretary, and in compliance with its missionary obligations as a health authority and responding to its legal responsibilities, has been working for a decade on the construction of a network adjustment proposal that allows The hospital crisis is over, guaranteeing quality providers of health services in each municipality of the department. Since 2003 and with a biannual frequency, the Departmental Secretary of Health has presented to the authorities

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national documents that proposed network adjustments, without these being approved, in some cases due to political pressures and in others arguing weaknesses in financial studies that guarantee viability.

The crisis has resulted in the lack of investment in the Public Network, lack of technological development, closure of services, deterioration of physical infrastructure, discomfort of users and workers.

It is as well as in the duration of the year 2013 was presented to the Ministry of Health and the proposed organization of the network of public services the Department of the Valley Social Protection of the Cauca called document Technical of "Transformation of the Organization of Service Providers Public Health of the Department of Valle del Cauca ", which was approved on October 7, 2013, through a technical concept by the governing body. From that same year, the described implementation began, making significant progress, but in the dynamics of the provision of services and the structure of the General System of Social Security in Health, there were situations that affected to a greater or lesser extent the Progress in the implementation of the different phases of the initially proposed network document .

Attention Model in the Cauca Valley

Within the framework of the General Social Security System and conditioned by the economic crisis, the provision of health services in the Department of Valle del Cauca responds to the need to manage morbidity and mortality, with the provision of curative health recovery services. However, in the framework of the execution of territorial public health plans and collective actions, ESEs provide health promotion and disease prevention services. The current care model could be described as pathocentric, mural, urban, medicalized, dependent on technological development in diagnostic means, and in pharmacopoeia.

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The effect of this care model based on the containment of spending results in the loss of quality of care and therefore in competitiveness, deterioration in public health indicators and increase in out-of-pocket expenditure of the population, deteriorating the quality of lifetime.

In parallel to all this problematic scenario defined at the national level, policy Attention Integral in Health, the which identifies as objective overall guiding the system towards generating better conditions of health of the population by regulating conditions agents' intervention towards "access to health services in a timely, efficient and quality way for the preservation, improvement and promotion of health", in order to guarantee the right to health, this is how the policy it requires the coordinated interaction of territorial entities in charge of public health management, insurers and service providers. Policy of Care Integral in Health is composed by: 1. A framework strategy transforms the principles and objectives into strategies, and 2. An operational model (Model Comprehensive Health Care - MIAS) that from the strategies adopted the operating and management mechanisms and instruments that guide the intervention of the different agents of the System.

Considered the determinants, there are four core strategies of Care Policy Integral in Health: 1. The care primary in health with focus on health family and community, 2. care 3. The comprehensive management of health risk and 4. The differential approach of territories and populations,

which the department of Valle del Cauca is working in order to consolidate the implementation of said model of care that allows improving health outcomes in accordance with what is defined in the Ten-Year Plan of Public Health and the Territorial Health Plan .

For it to a three (3) years from the stage of implementation of the reorganization of providers, advances were presented to the Ministry of Health and Social Protection and the

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necessary scope to the document "Transformation of the Organization of Public Health Service Providers of the Department", which were endorsed by said entity, through technical concept number 201642302120332 which is in force and where the Network of Service Providers of Public Health Department.

The Organization of Health Service Providers is distributed in 5 geographical areas which are integrated by a set of ESE as follows:
North Geographic Area

Geographic Area Centro Tuluá Geographic Area Buga Center Geographic Area South

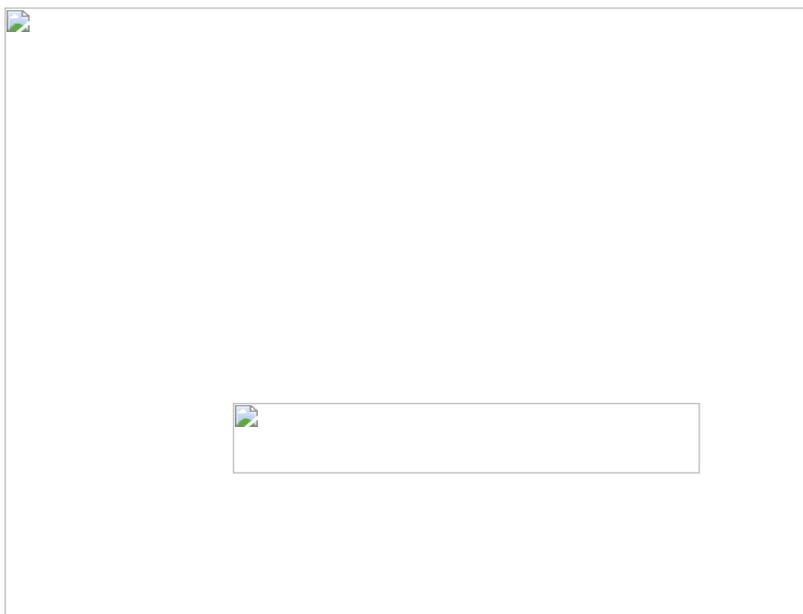
East Geographic Area South West



It is worth mentioning that the peaceful geographic area is not considered in the Network of Providers of Services of Health Public of the Department, to the settle in District by Law 1617 of 2015, however from the public health component is imperative to mention that the district continues to be a generator of important information for which you can not ignore that their situation affects health in ways direct the Network of the Valley to the be still incipient the consolidation itself of its network, in consequence of this was considered for this project the inclusion of two ESEs from the Buenaventura District.

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Illustration 4: Map of the design of the network of public health service providers of the Department of Valle del Cauca - by geographical areas 2016



Source: SDSV Technical Group Design

The Public Health Services Network is made up of a total of 4,734 health service providers, of which 895 are IPS, 51 of them ESE and two more specialized.

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Table 1: Valle del Cauca public network

PUBLIC NETWORK OF HEALTH SERVICES CAUCA VALLEY DEPARTMENT	
ENTITY	N °
THAT LEVEL III	1

THAT LEVEL II	7
THAT LEVEL I	43
THAT SPECIALIZED /	
MENTAL HEALTH	1
PEDIATRIC	1

SOURCE: REPS JUNE 30, 2017

The Valle del Cauca has a great problem in its installed capacity, which together with the poor technological development of the State Social Companies favors the increase in practices that derive the indiscriminate use of diagnostic aids (duplication of exams), lack of comprehensive care, among others, resulting in the increase of costs in health both for the network of providers of services of health, and for each of the social enterprises of the State, the more difficult when taking into account the increase in the ESE categorized at risk medium and high financial; This is how in 2014 the Fiscal and Financial Sanitation Programs of these hospitals categorized at risk were presented to the Ministry of Finance and Public Credit, which were made viable by said entity.

It is worth mentioning that the development of these sanitation programs allowed identifying important shortcomings regarding the quality of the Information, a common problem for many entities and that interferes with various processes within the entity, to finally affect the strategic planning of the same. and resource optimization .

The levels of care basic have high obsolescence technological deficiency in quantity, relevance and quality of the staff of health and of infrastructure, effects that

twenty

They can be evidenced in the public offer, where replacement investment has been scarce, taking into account the lack of resources.

In synthesis, the technological lag in the first level, reduction of the installed capacity in the second level and expansion of the participation of the private offer of services over the public offer and increase of the cost in health are evidenced. This is reflected in the processes weak reference and counter reference, almost no exchange of information from clinical records between providers and insurers, and the deficient processes of articulation of the providers in the networks to processes ensure health care under conditions minimum quality and lack of comprehensive care and indiscriminate payment of health services per patient.

Without But the improvement in the information of the processes essential to the SGSSS and of the provision of the services of health must overcome, among others, the following obstacles ⁵ :

- a) the asymmetry of the information between the different agents of the System,
- b) the resistance to making information transparent using service-oriented technology,
- c) the historical disarticulation between information on individual health interventions and collective interventions ,
- d) lack of effective incentives for the incorporation of processes and data in the comprehensive scheme of IT solutions with transactions at the central level ,
- e) the quality and reliability of the information as a condition for effective operations and transactions,
- f) computer applications without complying with basic standards that facilitate access to clinical information .

⁵ Technical guidelines for information requirements of MIAS - Module 8 - May 2017

twenty-one

Given the above, it is required that the national government and other stakeholders in the health sector to support the recovery process and projection of hospitals, strengthening the systems of information and management clinic of the data, technology and infrastructure, the skills of the human talent in health and in general the management of resources necessary for an optimal provision of the service in the public health network .

In addition the problems described, the Department of the Valley of the Cauca presents this proposal focused on strengthening the public network, crucial stage to ensure the proper provision of the services of health and impact of how comprehensive the quality of the care, but above all optimize the costs arising from the same, which reflect a significant increase in which the effective use of resources is not achieved. Is as well as the fragmentation of the information clinic from provider to provider has led to the increase of the turnover of services to support diagnostic and therapeutic among others, and features such as the timeliness and continuity of care are seriously affected as tracers in quality of the benefit and its impact on the welfare of the community.

In the field of ICT the Valley of the Cauca account in the IPS private and public with information systems (HIS) that are diverse in both functionality and technologies used, those which in spite of propender for the compliance of the legislation defined for it, in their majority they do not achieve the integration of the required information for various areas of the institution, situation that can generate among others, low quality of care by not having comprehensive patient information, (for example: non-relevance in the clinical diagnosis) , in turn, can result in the definition of causes of morbidity

and mortality outside the reality of the population served, duplication of medical systems, little control of the cost in health, among others ... not to mention the difficulty in interacting with other members of the Network of Providers that work

as a complement to comprehensive care. The above limits quality health care to the Vallecaucana population.

In addition, there is one set of processes that do not are being implemented in the form properly, and fieldwork with stakeholders in the health sector has shown that to provide real efficiency in providing the service, clear processes required, comprehensive, diligent and participatory.

Consequently, this project presents a technological solution that allows impact the cost of health of the institutions providers of services of health public attending the vallecaucana population, which results in reducing gaps fragmentation of information considering the Date does not have a technological operation model that allows the integration of the clinical information of the people served.

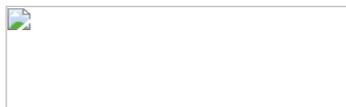
This is how one of the most representative objectives is to achieve the integration of information for the network of health service providers in the department of Valle del Cauca.

The situational analysis of the Department of Valle del Cauca carried out above can be represented graphically through the following problem tree:

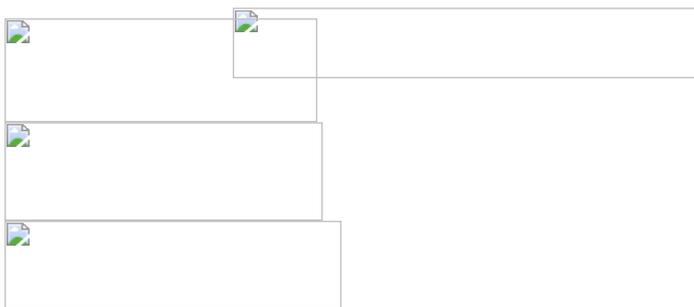
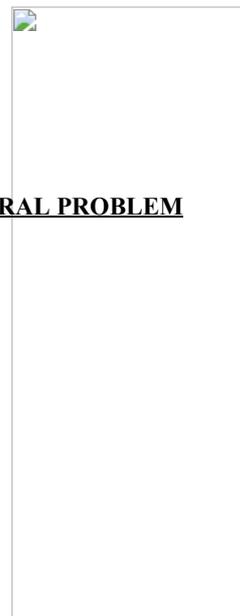
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EFFECTS



CENTRAL PROBLEM



CAUSES



4. IDENTIFICATION AND ANALYSIS OF PARTICIPANTS

Below is the matrix containing the identified participants, as well as their interests and / or expectations:

Table 1: Participant analysis

Actor	Interest - Expectation	Position /	Contribution
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		Role	
Cauca Valley Governorate	As governing body must respond to the needs, expectations and problems of population health in its jurisdiction.	Cooperating	The Department's contribution can be technical / administrative (formulation, execution and supervision of the project) and financial (at the level of royalty resources).
ESE (State Social Companies) and IPS	Have criteria and processes that promote improvements in the provision of services.	Beneficiary	These institutions will be technologically strengthened and in the management of processes and procedures for information capture and management.
Users of the public health network of Valle del Cauca	Demand the provision of the different services of the public health network in the best conditions of quality and efficiency.	Beneficiaries	Knowledge and oversight to the execution of the project.

Source. Own elaboration

Participant analysis :

Goal of the Development Plan from the Ministry of Information Technologies and the Communications, has been advanced to establish and run one departmental agenda on each of the strategic and within which have involved civil society sectors and institutional actors The above, intervening one of the most felt needs of the Department: articulate social health information, which allows significant improvements in the quality of service provided in the public health network of the department of Valle del Cauca.

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In accordance with the exposed problem and the competences of Law, the Government of Valle del Cauca, headed by the Departmental Secretaries of Health and Information Technology and Communications, works on an innovative proposal that allows the Department to develop and execute a departmental agenda on each of the strategic sectors and within which civil society and institutional actors have been involved. The foregoing, giving scope to the objectives proposed from the National Development Plan and the Territorial Plan, for which it is intended to intervene one of the most felt needs of the Department: "Strengthening the technical and technological capabilities of the Public Health Network of the Department of Valle del Cauca "

5. LOCATION AND AFFECTED POPULATION**Department Location:**

The Department of Valle del Cauca, is located in the southwest of the country, between the Andean Region and the Pacific Region. Much of the department is between the western and central mountain ranges, in the geographical valley of the Cauca River where its name comes from.

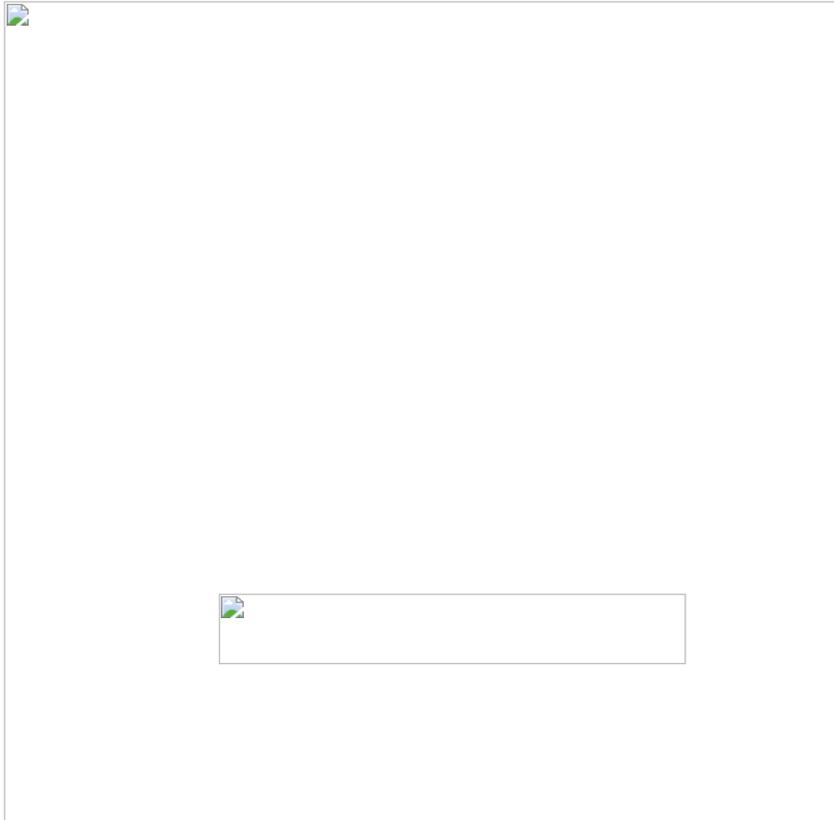
It is composed of 1 district and 41 municipalities. It limits to the north with Risaralda, to the northwest with Chocó, to the south with Cauca, to the east with Quindío and Tolima, and to the west with the Pacific Ocean, having Malpelo Island under its jurisdiction. Its capital is Santiago de Cali, which has a population of 2,369,821. (Source: Statistical Yearbook of Valle del Cauca 2015).

It is the third most populous department in Colombia (4 660 438 inhabitants in 2016) 3 and the twenty-second extension (22,195 km²).

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Illustration 6: Political-Administrative Division Department of Valle del Cauca





Source: IGAC-CVC

Accessibility Roads and Media

Valle del Cauca is one of the most potential departments in the country for its privileged location within the national geography (Map 4), with the most important port in the Pacific Ocean and one of the most important road infrastructure

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Modern country. The road network in the department is composed of 7800 km. The 7.7% of the network traffic of the valley corresponds to the network backbone national, built by the trunk western and transverse to Bonaventure. 92.3% to the secondary and tertiary network in charge of the department and municipalities. Some sections of high vehicular movement, feature of dual carriageway: Buga - Tuluá (24 Km.), Cali - Yumbo (15 km.) And Cali - Palmyra (28 km.).

The Buga - Tuluá - La Paila dual carriageway, a fully constructed work, is in full operation, by concession to PISA, with a length of 57.6 km. The maximum distance of a municipal capital to Cali, from Cairo, is 4 hours.

Despite road development, the Valley of the Cauca has isolated communities can be named indigenous communities living atop Canyon Ticks between the municipalities of El Dovio and Bolivar, which require up to more than 8 hours to reach the first center populated, and the communities located along the Pacific coast, in the municipality of Buenaventura.

The distance between Buenaventura and Cali is 128 km, but the travel time is variable. The long awaited in conditions normal is of is of 2 hours while difficult to achieve since, for more than 8 years , the road is in work, which does not allow fluidity in the movement. On the other hand, the land that borders the road to the sea is unstable and landslides are frequent .

There are 187 kilometers between Cartago and Cali, with an average journey time of 2 hours 30 minutes. The road between these two municipalities is characterized by high mobility, is built in double lane and 80% is in excellent condition. It can be assured that Zarzal is equidistant from the municipalities of Cartago and Tuluá. Of the two approximately 47 km separate it. Between Roldanillo and Tuluá by the Pan-American highway there are 52 km

28

away From Caicedonia to Seville there are 19 km and the distance between Seville and Tuluá is 57 km.

Alfonso Bonilla Aragón international airport characterized as the second most important in the country. It also has the airports of Juanchaco and Ladrilleros and Santa Ana in Cartago.

Department population:

Valle del Cauca has approximately 4,613,684 inhabitants and according to the projections of the National Administrative Department of Statistics (DANE) for 2016, just over half (51.37%) of the population of Valle del Cauca will be concentrated in the municipality of Cali . In its turn, it is expected that the population vallecaucana is made mostly of 2,378,331 women and 2,235,353 men. With regard to the area of residence it is estimated that for the year 2016, 4,074,630 of inhabitants settled in the urban area and 585,808 people, were located in the area rural.

The DNP in the departmental territorial characterization sheet for 2016, indicated that there are 2,270,485 people affiliated with the contributory regime, while 1,821,544 are affiliated with the subsidized health regime, (using the Ministry of Health for 2015), the above becomes a big problem because of the large proportion of people who do not have any type of affiliation or who are outside the system.

The coverage of affiliation to the General System of Social Security in Health in our department as of October 2017 was 90.23%. 36% corresponds to the subsidized regime (1,727,506 affiliates) and 52.35% in the contributory regime (2,464,468 affiliates) and 1.19% are characterized as an exception (September 2017). (Source: Office of Insurance - Departmental Secretary of Health October 2017).

Specific Project Location:

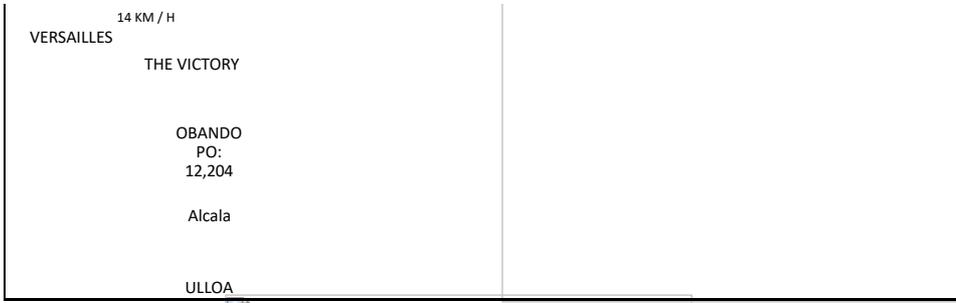
In the document of "Transformation of the Organization of Public Health Service Providers of the Department", which was endorsed by the Ministry of Health through technical concept number 201642302120332, the Network of Public Health Service Providers of the Department is established, the which is composed of 5 geographical areas in which different ESEs are integrated as follows :

Illustration 2: Network of providers of Valle del Cauca

GEOGRAPHIC AREA	MUNICIPALITIES	NAME OF THE PROVIDER
NORTH	Carthage	H Saint John of God Carthage IPS of the Municipality of Cartago ESE
	Cairo	H Santa Catalina
	Algeria	H Pius XII
	The Eagle	H San Rafael
	Ansermanuevo	H Santa Ana de los Caballeros
	Alcala	H Saint Vincent de Paul
	Ulloa	H Pedro Sáenz Díaz
	Obando	H Local
	The Union	H Gonzalo Contreras
	The victory	H Our Lady of All S.
	Bull	H Holy Family
	Versailles	H St. Nicholas
	Bramble	H San Rafael
TULLUÁ CENTER	Tulua	Tomas Uribe Uribe Hospital H Rubén Cruz Vélez
	Andalusia	H San Vicente Ferrer
	Bugalagrande	H Saint Barnabas
	Cold river	H Kennedy
	Trujillo	H Santa Cruz
	San Pedro	H Ulpiano Tascón Q
	Roldanillo	H San Antonio
	The Dovie	H Santa Lucía
	Bolívar	H Santa Ana
	Seville	H Centenary
Caicedonia	H Santander	
BUGA CENTER	Buga	H Divine Child
	Restrepo	H San José
	Calima - Darién	H Saint George
	Geneva	H Del Rosario
	Guacarí	H San Roque
	T touch	H Local
SOUTHEAST	Palmira	H. Raúl Orejuela B

	Candelaria	H Local
	The hill	H. San Rafael
	Florida	H. Benjamin Barney
	Meadow	H. San Roque
SOUTH WEST	CALI	H University of the Valley
		H Psychiatric of the Valley
		H Mario Correa Rengifo
		H Isalás Duarte Cancino
		ESE Ladera Health Network
		ESE Health Network Center
		ESE Suroriental Health Network
		ESE Oriente Health Network
	ESE North Health Network	
	Yumbo	H The Good Hope
	Jamundí	H Pilot
Vijes	H Local	
The top	H Santa Margarita	
Dagua	H Rufino Vivas	

Source: self made



Source: Network Documents - Ministry of Deptal Health. From the Cauca Valley

Taking into account the previous graph and where the route of patient care in the North area is presented, the proposed solution aims to respond

the fragmentation of the information given in each of the ESE of the Department, of which do not have to unification of systems of information, so that limits the interaction of information, thus enhancing the relevance and use of services the rest of the areas defined below.

Illustration 10: **CENTRO TULUÁ GEOGRAPHICAL AREA :**
Source: Network Documents - Department of Deptal Health. From the Cauca Valley



Illustration 11: **SOUTHEAST GEOGRAPHICAL AREA :**
Source: Network Documents - Department of Deptal Health. From the Cauca Valley

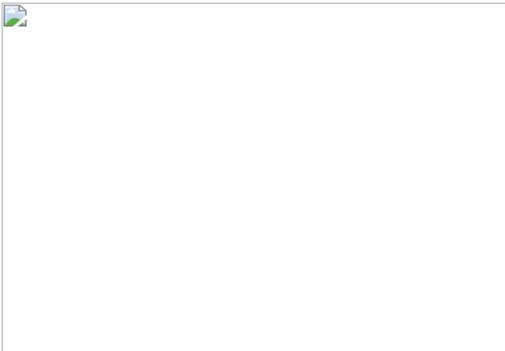
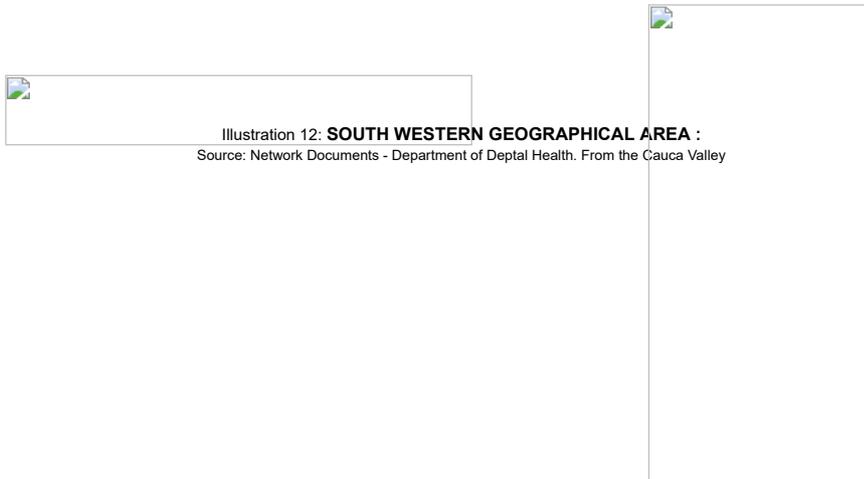
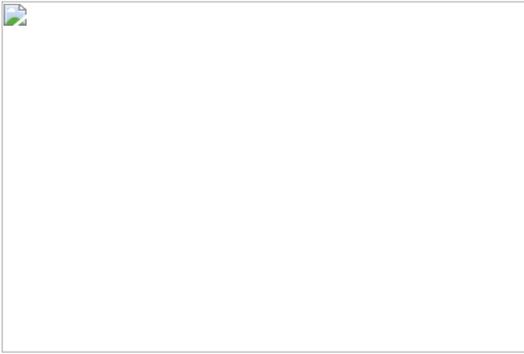


Illustration 12: **SOUTH WESTERN GEOGRAPHICAL AREA :**
Source: Network Documents - Department of Deptal Health. From the Cauca Valley





6. OBJECTIVES

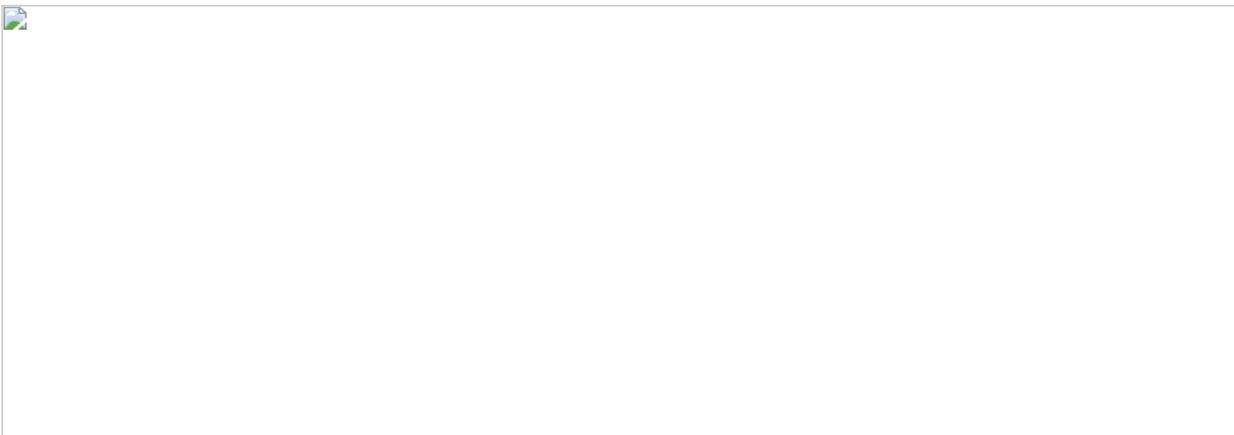
Taking into account the previous problem and the affected population, the objectives of the project can be established as described below:

Table 3. Measurement of the general objective

Overall objective	Indicator	Unity	Goal
Strengthen the technical capacities and technologies of the public health network, to guarantee the quality of the information that allows adequate provision of health service in Valle del Cauca	Strengthened Public Health Network	Number	1

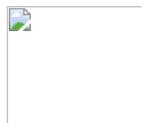
Source: self made

Specific objectives and relationship with the causes of the problem



Objetivos específicos

NIT: 890399029-5
 Palacio de San Francisco - Carrera 6 Calle 9 y 10 Telephone: 6200000 Ext. 2399 Website:
www.valledelcauca.gov.co e-mail: tic@valledelcauca.gov.co Santiago de Cali, Valle del Cauca, Colombia



7. SCOPE OF THE PROJECT

In addition to the problem described, the Department of Valle del Cauca presents this proposal focused on the technological strengthening of the public network, a fundamental scenario to guarantee the adequate provision of health services and to comprehensively impact the quality of care and optimize costs derived from it, which does not allow the effective use of resources,

which requires the articulation of these institutions through access to relevant data for comprehensive patient care, the above in order to improve the quality and opportunity of people's attention .

This is how the fragmentation of the clinical information from provider to provider has led to an increase in the billing of diagnostic and therapeutic support services among others, and features such as the opportunity and continuity of care are seriously affected as trace elements in quality of the benefit and its impact on the welfare of the community.

In accordance with the resources prioritized by the department for the present project it can be summed up the extent of the same in the following way:

- Articulation of clinical information among providers that make up the public health network in Valle del Cauca, through the definition and implementation of an operation and electronic data management model that includes (among others), the standardization of processes of capture, processing, use and appropriation of the solution, and security of the clinical information, in order to prepare the ESEs attached to the public network, so as to make effective use of the information exchange services framed in the citizen services digital
- Enabling of points of integration in the architecture of distribution of applications participants.
- Strengthening of the infrastructure technology to through to the acquisition of equipment for computer and one solution passive of connectivity for each one of the ESE of the network public of health of the Valley of the Cauca (and of the District Special Buenaventura), to facilitate the implementation of the entire technological solution, and the accessibility and availability of the data exchanged.

Next, and according to this scope, the entities and municipalities where the project will be executed are presented:

Table 5: Entities benefited from the Project

No	Municipality	First name	Level	Character	Thirst is
1	Alcala	SOCIAL COMPANY OF THE STATE HOSPITAL SAN VICENTE DE PAUL	1	MUNICIPAL	01
two	ANDALUSIA	SAN VICENTE FERRER ESE HOSPITAL	1	MUNICIPAL	01
3	ANSERMANUEVO	SANTA ANA DE LOS CABALLEROS HOSPITAL - ESE SOCIAL ENTERPRISE OF THE STATE	1	MUNICIPAL	01
4	ALGERIA	PIO XII ESE HOSPITAL	1	MUNICIPAL	01
5	BOLIVAR	SANTA ANA ESE HOSPITAL	1	MUNICIPAL	01
6	BUENAVENTURA	LUIS ABLANQUE DE LA PLATA HOSPITAL SOCIAL COMPANY OF THE STATE	1	MUNICIPAL	01
7	BUENAVENTURA	SAN AGUSTIN HOSPITAL SOCIAL ENTERPRISE OF THE STATE	1	MUNICIPAL	01
8	BUGALAGRANDE	SAN BERNABE HOSPITAL, ESE	1	MUNICIPAL	01
9	CAICEDONIA	ESE HOSPITAL SANTANDER	1	MUNICIPAL	01
10	CALI	VALLE UNIVERSITY HOSPITAL "Evaristo Garcia" ESE	3	ENTAL DEPARTMENT	01
eleven	CALI	VALLE ESE UNIVERSITY PSYCHIATRIC DEPARTMENTAL HOSPITAL	two	ENTAL DEPARTMENT	01
12	CALI	MARIO CORREA RENJIFO DEPARTMENTAL HOSPITAL COMPANY SOCIAL DEL ESTADO	two	ENTAL DEPARTMENT	01
13	CALI	ESE HEALTH NETWORK OF THE STATE SOCIAL ENTERPRISE CENTER HOSPITAL PRIMITIVO IGLESIAS	1	MUNICIPAL	01
14	CALI	ISAIAS DUARTE CANCINO HOSPITAL SOCIAL ENTERPRISE OF THE STATE	two	ENTAL DEPARTMENT	01
fifteen	CALI	EAST HEALTH NETWORK ESE STATE SOCIAL ENTERPRISE	1	MUNICIPAL	01

No	Municipality	First name	Level	Character	Thirst is
16	CALI	ESE HOSPITAL GERIATRICO ANCIANATO SAN MIGUEL	1	MUNICIPAL	01
17	CALI	NORTH HEALTH NETWORK STATE SOCIAL ENTERPRISE	1	MUNICIPAL	01
18	CALI	SOUTHEAST HEALTH NETWORK ESE - CARLOS CARMONA M. HOSPITAL	1	MUNICIPAL	01
19	CALI	LADERA HEALTH NETWORK SOCIAL COMPANY OF THE STATE	1	MUNICIPAL	01
twenty	CALIMA	ESE SAN JORGE HOSPITAL	1	MUNICIPAL	01
twenty-one	CANDELARIA	ESE LOCAL HOSPITAL	1	MUNICIPAL	01
22	CARTAGO	IPS OF THE MUNICIPALITY OF CARTAGO ESE	1	MUNICIPAL	10
2.3	DAGUA	JOSE RUFINO VIVAS ESE LOCAL HOSPITAL	1	MUNICIPAL	01
24	THE EAGLE	SAN RAFAEL HOSPITAL SOCIAL ENTERPRISE OF THE STATE	1	MUNICIPAL	01
25	CAIRO	ESE SANTA CATALINA HOSPITAL	1	MUNICIPAL	01
26	THE HILL	ESE SAN RAFAEL HOSPITAL	1	MUNICIPAL	01
27	THE DOVIO	SANTA LUCIA ESE HOSPITAL OF EL DOVIO VALLE	1	MUNICIPAL	01
28	FLORIDA	SOCIAL COMPANY OF THE STATE BENJAMIN BARNEY GASCA HOSPITAL	1	MUNICIPAL	01
29	GENEVA	ESE HOSPITAL DEL ROSARIO	1	MUNICIPAL	01
30	GUACARÍ	SAN ROQUE HOSPITAL EMPRESA SOCIAL DEL ESTADO	1	MUNICIPAL	01
	GUADALAJARA				

31	DE BUGA	THAT. DIVINE CHILD HOSPITAL	1	MUNICIPAL	01
32	JAMUNDÍ	ESE JAMUNDI PILOT HOSPITAL	1	MUNICIPAL	01
33	THE TOP	SANTA MARGARITA ESE HOSPITAL	1	MUNICIPAL	01
3.4	THE UNION	GONZALO CONTRERAS HOSPITAL SOCIAL COMPANY OF THE STATE	1	MUNICIPAL	01
35	THE VICTORY	THAT HOSPITAL NUESTRA SEÑORA DE LOS SANTOS	1	MUNICIPAL	01
36	OBANDO	ESE LOCAL HOSPITAL OF OBANDO	1	MUNICIPAL	01
37	PALMIRA	THAT RAUL OREJUELA BUENO HOSPITAL	1	MUNICIPAL	49
38	MEADOW	ESE SAN ROQUE HOSPITAL	1	MUNICIPAL	01
39	RESTREPO	ESE SAN JOSE HOSPITAL	1	MUNICIPAL	01
40	COLD RIVER	KENNEDY ESE HOSPITAL	1	MUNICIPAL	01
41	ROLLER RING	SAN ANTONIO DE ROLDANILLO DEPARTMENTAL HOSPITAL EMPRESA SOCIAL DEL ESTADO	two	ENTAL DEPARTMENT	01
42	SAN PEDRO	ESE ULASON LOCAL HOSPITAL TASCÓN QUINTERO	1	MUNICIPAL	01
43	SEVILLE	ESE SEVILLA CENTENARY DEPARTMENTAL HOSPITAL	two	ENTAL DEPARTMENT	01
44	BULL	HOSPITAL SAGRADA FAMILIA ESE	1	MUNICIPAL	01
Four. Five	TRUJILLO	ESE HOSPITAL SANTA CRUZ	1	MUNICIPAL	01

No	Municipality	First name	Level	Character	Thirst is
46	TULUÁ	STATE SOCIAL COMPANY HOSPITAL RUBEN CRUZ VELEZ	1	MUNICIPAL	01
47	TULUÁ	ESE HOSPITAL DEPARTMENTAL TOMAS URIBE URIBE DE TULUA SOCIAL ENTERPRISE OF THE STATE	two	ENTAL DEPARTMENT	01
48	ULLOA	HOSPITAL LOCAL PEDRO SAENZ DIAZ SOCIAL ENTERPRISE OF THE STATE	1	MUNICIPAL	01
49	VERSAILLES	ESE HOSPITAL SAN NICOLAS	1	MUNICIPAL	01
fifty	VIJES	LOCAL HOSPITAL OF VIJES SOCIAL ENTERPRISE OF THE STATE	1	MUNICIPAL	01
51	I TOUCH	ESE YOTOCO LOCAL HOSPITAL	1	MUNICIPAL	01
52	Yumbo	LA BUENA ESPERANZA ESE HOSPITAL	1	MUNICIPAL	01
53	ZARZAL	ESE SAN RAFAEL DEPARTMENTAL HOSPITAL	two	ENTAL DEPARTMENT	01

Source: 2017 Department of Health Secretary

7.1 Relevance with guidelines and policies of the Ministry of Information Technology and Communications

In order to adapt and strengthen the institutional processes of the ESCOs belonging to the network of providers of the Valley of the Cauca, this develops draft a comprehensive proposal that relies on the interoperability framework (MINTIC), on which determines the guidelines and recommendations for the efficient exchange of information between state entities. According to this framework, five domains of interoperability must be contemplated : technical, semantic, organizational, socio-cultural, political- legal.

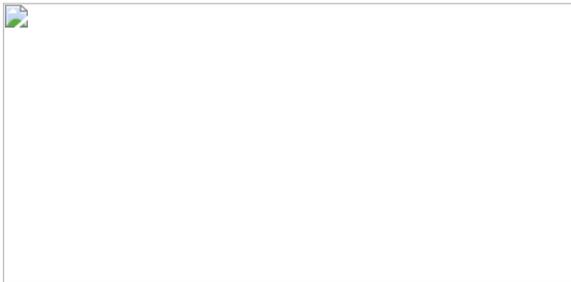


Illustration 14: Interoperability levels

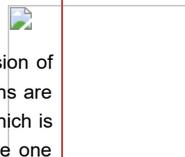
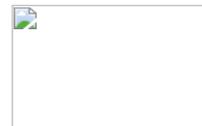
Source: Review of interoperability standards for e-Health in Latin America and the Caribbean

These domains are specifically related to component one of the project and whose specific objective is to “articulate clinical information among the providers that make up the network”, in order to guarantee availability and access to clinical information among service providers. of health. The relationship of the project activities with the domains is as specified below:

Activity_name : Process definition of the operation model and electronic information management

Interoperability domain : Organizational.

Activity-domain relationship : The ESEs of Valle del Cauca, must adapt their institutional processes for the incorporation of information exchange services and must adopt standardized procedures for the consumption, design, implementation and provision of services of said services. It must ensure that the processes of the health institutions are effectively supported by a set of application components in interaction, for what which is required to coordinate the succession of steps and tasks of work making possible one performance together. It is important to keep in mind that one system information on health solid depends on processes organized to integrate, share and use health data effectively.

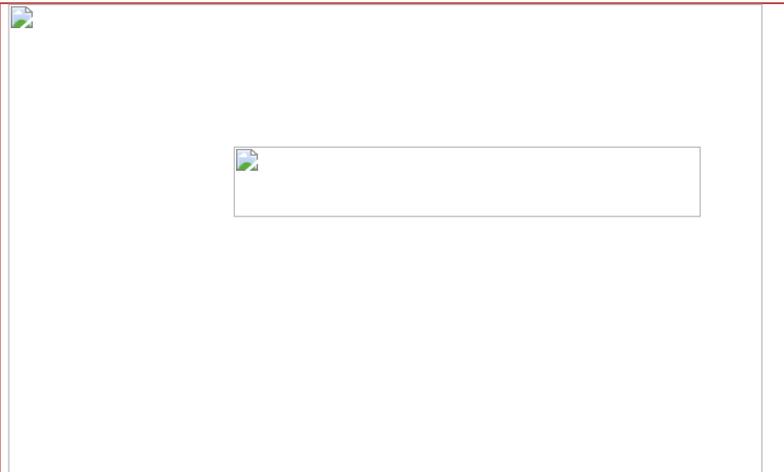


Name of the activity: Definition of requirements for capture and management of clinical information that impacts the quality of the data input to the system

Interoperability domain: Semantic.

Activity relationship domain: As for the semantic domain, entities must adopt a common language for the exchange of information so that information exchanged may be interpretable in form automatically and reusable for applications that were not involved in its creation. As examples of systems of concepts in health are:

- (a) The CIE system (International Statistical Classification of Diseases).
- (b) SNOMED for medical terms,
- (c) ATC for medications,
- (d) NANDA for nursing diagnoses ,
- (e) LOINC for coding laboratory procedures .
- (f) CUPS
- (g) CUM (unique medication code)



When applications use different systems of concepts, their mapping is necessary for mutual translation. In addition, semantic integration can be supported by "dictionaries of data physicians" (MDDs medical data dictionaries), which are central catalogs of medical concepts and terms that offer the possibility of representing the relationships semantics between all the data stored in the systems of information in health, linking local vocabulary to standardized nomenclatures. They can be independent applications or part of the existing ones.

In this domain you must also define the CMBD (minimum basic set of data), understood as the most relevant data of each clinical event that in the future can be exchanged

Activity name: Definition and implementation of an appropriation strategy of the interoperability scheme of the systems of information.

Interoperability domain: sociocultural.

Relationship activity and domain: among the actions that are expected to be carried out framed in this domain we find that the institutions that make up the network of health service providers in Valle del Cauca must:

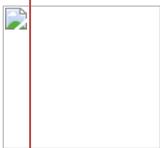
- Disclose the needs, the scope and the commitments of the services of exchange of information between the actors involved.
- Develop the skills and abilities necessary for the consumption, implementation and provision of information exchange services .
- Foster collaboration and participation with each other to facilitate knowledge management.

Name of the activity: Implementation of the computer security plan that guarantees the confidentiality of the information of the users of the public health network.

Interoperability domain: Political-legal

Activity and domain relationship: among the actions that will be executed in the ESEs, within the framework of this domain are:

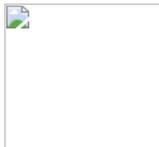
- Establish and implement the legal instruments that facilitate the use or provision of information exchange services .
- Ensure the proper handling of confidential and personal information of patients in the network.



Name of the activities:

- Enabling integration points in the distribution architecture of the participating applications.
- Implementation of a technological solution for the availability and continuity of information.
- Acquisition of computer equipment for institutions attached to the network public of health of the Valley of the Cauca

Interoperability domain: Technical



Continuing with the relationship with the sectoral guidelines, the Ministry of ICT has established the Business Architecture Reference Framework that corresponds to a reference model made available to the Colombian State entities, to be used to support the structuring of the business architectures both sectoral and institutional. The structure of the AE Reference Framework for the Colombian State is composed of the following elements: a) Principles b) Domains c) Knowledge base ⁷.

As for the principles, the framework should be developed on the basis of the principles enshrined in the Articles 209 of the Constitution Politics, 3rd of the Law 489 of 1998 and 3 of Law 1437 of 2011 and additionally on the following principles (applicable to this project):

- ✓ Excellence in citizen service: To strive for the superior purpose of strengthening the relationship of citizens with the State.
- ✓ Investment with a good cost / benefit ratio: Provide that IT investments represent a measured return, due to the impact of the projects.
- ✓ Rationalization: Seek optimization in the use of resources (in this case information) taking into account criteria of relevance and reuse.

⁶ Document for the revision of interoperability standards for e-health in Latin America and the Caribbean - Pan American Health Organization and World Health Organization.

⁷ Design and specification of the MINTIC Business Architecture Reference Framework.

- ✓ Standardization: To be the basis for the definition of the guidelines, policies and procedures that facilitate the evolution of the IT management of the Colombian State towards a standardized model .
- ✓ Interoperability: Strengthen interoperability schemes that standardize and facilitate the exchange of information between entities and sectors, management of unique sources of information and the provision of services.
- ✓ Co-creation: Allow to compose new solutions and services on what has already been built and defined.
- ✓ Scalability: To enable continuous evolution and the addition of all components and domains that you make, without losing quality or joint.
- ✓ Information Security: Allow the definition, implementation and verification of information security controls .
- ✓ Neutrality Technology: It will take into account the definition of the Decree 2573 of 2014, "by which the general guidelines established by the Strategy of Government in line of the Republic of Colombia ...", the which says: *Ensure free technology adoption , taking into account recommendations, concepts and regulations of the competent and competent international organizations in the field, which allow to promote the efficient provision of services, use content and applications that use Information and Communications Technologies, as well as guarantee free and fair competition, and that its adoption be harmonious with sustainable environmental development.*

As for the domains established in this frame of reference, they are related to the different activities of the project as follows:

Table 6: Business Architecture Framework domains

Domain

Project Activity	of interoperability	Business Architecture Framework Domain
Process definition of the electronic operation and management model of information	Organizational	<u>IT Strategy</u> : Definition of standards so that the IT Strategy of the institutions is aligned with that of the Health sector. <u>IT Governance</u> : definition of standards to articulate the processes of the entities of the Health sector.
Definition of capture requirements and management of clinical information that impact the quality of data entry to the system	Semantic	<u>Information</u> : This domain allows to define the design of the information services in Health, the quality management of the same, the management of the life cycle of the data, the analysis of information and the development of capacities for the strategic use of the same.
Definition and implementation of an appropriation strategy of the interoperability scheme of information systems.	Socio - Cultural	<u>Use and Appropriation</u> : This domain allows defining the strategy and concrete practices for the use and appropriation of the interoperability solution in the Health Sector, which includes change management and interest group management.
Enabling points of integration architecture distribution of the participating applications.	Technical	<u>Information systems</u> This domain is related to the interoperability management of information systems in the Health sector and its implementation process.
Implementation of a technological solution for the availability and continuity of information	Technical	<u>Technological services</u> This domain allows managing the technological infrastructure that supports information systems and services in public health network institutions with greater efficiency and transparency.
Acquisition of computer equipment for institutions attached to the public health network of Valle del Cauca	Technical	

Source: self made

7.2 Relevance with guidelines and policies of the Ministry of Health and Social Protection

The Department of Valle del Cauca through the Department of Health Secretary, and in compliance with its missionary obligations as a health authority and responding to its legal responsibilities, presented to the Ministry of

Health and Protection Social the proposal of organization of the network of services public of the Department of Valle de Cauca called White Paper "Transformation of the Organization of Providers of Services of Health Public of the Department of the Valley of the Cauca", which was approved on 07 October 2013; however in the context of the implementation of the regional public health plans and actions collective, the ESE provide services for promotion of the health and disease prevention under a model of care defined as patocéntrico, mural, urban, medicalized, dependent on technological development in diagnostic means, and in pharmacopoeia.

It is important to specify that in virtue of which this initiative of the project due to a need particularly of the Department, for thus the framework law is based on the provisions issued by the honorable assembly of the Department, meeting the requirements and expectations that are in the health sector our territory and in which the solution to these problems is mediated by the information technology and communications.

In that sense our legal framework is defined both by Ordinance 415 of 2016 by which adopts the Plan Development Department "The Valley is in You" and the ordinance 430 by means of the which is formulated the framework guiding of the public policy and of the strategy for the development of information and communications technologies for an Intelligent and Innovative Valle del Cauca and which establishes the objectives of the ICT policy in the health sector in the Valle del Cauca.

8. A SOLUTION LTERNATIVES

To better understand the proposed alternatives, it is important to consider the following definition of HIS:

HIS (Electronic Medical Record): is an information system that contains all those details and set of personal, family and environmental clinical data, which systematically, automatically, clearly, accurately, detailedly and tidily collects the most relevant patient information, from the moment that it demands health services, and through each of the phases of treatment, monitoring and control, which are essential to exercise in the patient an adequate diagnosis and treatment, also providing adequate levels of quality and satisfaction. In this sense, we can affirm that the electronic medical record acts as a repository of Physicians in each IPS and considering that the information is stored electronically, this allows to share and manage it easily between the different modules of one same system HIS

8.1 Technical analysis of alternatives ALTERNATIVE 1:

Alternative name: Implement a single medical record system for all the network public of the Department, to through to the centralization of the clinical information of patients.

Description of the alternative: In this case it considers the implementation of a bus integration allows a unified electronic medical record, to which can access the hospitals and clinics of the Department of all the levels of complexity. This initiative includes the creation of a database on "the cloud", a centralized repository containing all the clinical record of each patient in a way that the information can be consulted by any

service provider, in order to expedite the control and consultation of the clinical events of the patients of the public health network of the Department of Valle del Cauca.

The solution developed is in capacity to bring together the technologies and the appropriate standard that allows safeguarding and managing clinical records of patients using the best practices in the development of software and management of the same.

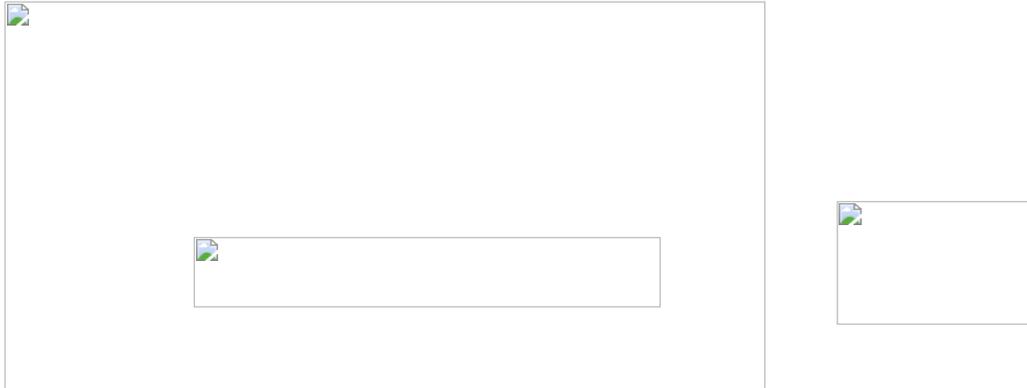


Illustration 15: Scheme of the interoperability service via integration bus

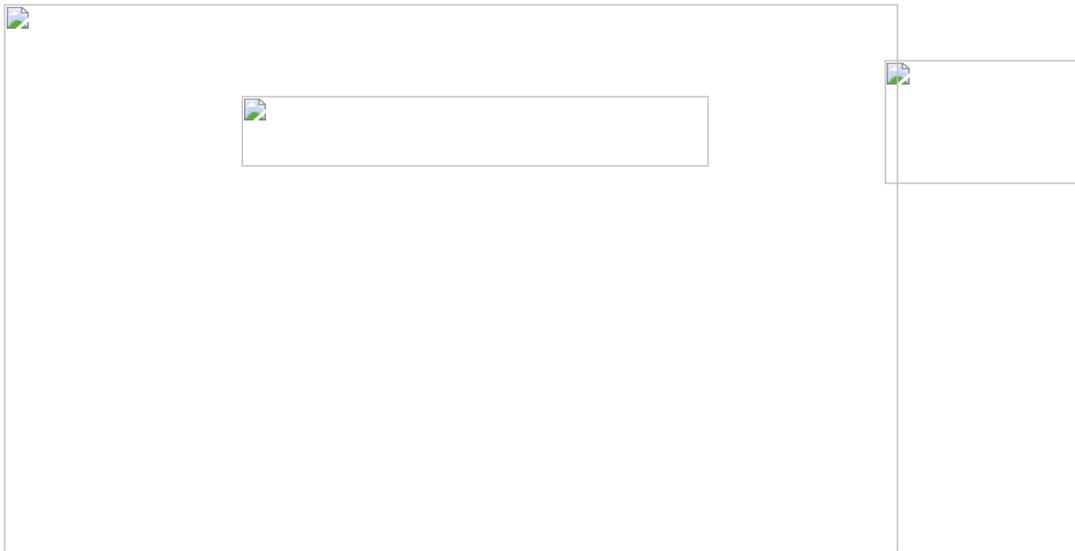
This alternative is no longer viable considering that it refers to a centralized repository with all the clinical events of the users of the public network and additionally, the provision of the interoperability service is a role that only the operators of the citizen services must assume. digital when Decree 1413 of 2017 of the Ministry of ICT enters into force .

ALTERNATIVE 2:

Name of the alternative: *Strengthen the network public of health of the Valley of the Cauca, through a solution that ensures the portability of clinical information from the Department*

Description Alternative: Given the financial difficulties and backwardness technology of the institutions of our network public of health (see Document diagnosis and description of the problem), it is evident that not be found ready to take the exchange of information, especially if we consider the lack of standardization of the processes and procedures institutional deficiencies in resources such as hardware, software and connectivity. The alternative present guarantee states that all IPS public network count with HIS systems which can support the processes previously defined and standardized for ESE, in addition to counting with the elements of accessibility, security and integrity of information that enables expose services or messages allowing the interaction of the records doctors. But to ensure the capture, quality of the data and the safe and timely exchange of information through electronic means, it is necessary to have an infrastructure of computer equipment and optimal connectivity, HIS Information System that use the necessary standards to achieve the interaction with other systems, in a safe and consented way; those standards must be accepted art worldwide and with all the documentation required to facilitate the use by part of the institutions of health.

Illustration 16: Electronic Health Standards



Source: ECLAC

Additionally, such development is required to be WEB, with free tools that do not require the purchase of basic Software licenses from customers, that guaranteed the low cost of the solution and thus be accessible to small-income health institutions.

To detail the solution we will specify the delivery for each of its components:

Component 1- Operation and electronic information management model: This component considers the strengthening of organizational processes and procedures, strategy for use and appropriation of the solution, and the implementation of the computer security plan. Currently every IPS

has defined the process of capture and treatment of the information clinic in accordance with its operation and system of information clinical, so that is one problem to integrate and records that these are not homogeneous, although Act 1438 regulates the use of the history clinic electronics, the various manufacturers of software you have implemented according to their experience to the like processes.

For this reason it is essential to perform a standardization of the capture and management of clinical data, to then expose them and be able to be consulted by other actors. The planet standardization strengthen the data capture process, as it is essential to consolidate the clinical records later. In the definition of these standard processes, the controls that each IPS must perform to guarantee that the exposed data are reliable and contribute to the improvement of the quality of the service are also contemplated. Should establish standard processes of consultation of information to guarantee the reservation that the data clinical hold.

Additionally within this first component and taking into account the guidance of use and appropriation of MINTIC established for the implementation of the domain "Use and ownership" that make up the frame of reference of Architecture IT in Colombia, the strategy associated with this project should establish guidelines aimed at achieving the involvement of various groups of interest in the participation of the technological initiatives and skills development as enabling IT strategies entities the health sector. The attributes that the plan must take into account are the following:

Table 8: Definition of the Use and Appropriation Plan

Attribute	Description
Stakeholder Involvement	Design strategy use and appropriation to allow the mobilization of groups of interest on behalf of this solution technology, to the inside of the ESE, reaching transformations required by each institution. The definition of a matrix is suggested where the impacted interest groups are identified, classified and prioritized . The possible roles to identify are: * Sponsor: contribute to that the entities ownership and accept the technological solution. * Change agent: change leaders . * Impacted: main affected by the change. * Multiplier: they contribute to the promotion of change and its dissemination, without necessarily being impacted by the technological solution .
Training	Develop competencies and skills needed for consumption, implementation and delivery of the solution between institutions providers of services of health. In the definition of the tasks of training it is suggested to take into account the following criteria: Group of interest to impact, Skills IT to develop training, target of the training plan, Actions training impart, Channel: face, Head (Personal external and / or internal), Material of support employee, schedule of activities of the plan, or strategy Definition squad for the call. A "training of trainers" strategy will be used, and a Combined Learning methodology is suggested, understood as the articulation of face-to-face activities, in a process in which both actions complement each other to strengthen the defined learning. You can define a virtual training space or tool, whose scope is the reinforcement of key concepts for the development of the practices, complementing with the face- to- face work where the trainer builds

	and develops other activities.
Management of the change	Incorporate into the strategy the actions that promote an adequate preparation of the change and management of impacts derived from the implementation of projects related to interaction of the providers in the network public health of the Valley of the Cauca.
Monitoring	Implement indicators of Use and appropriation that allow to evaluate the level of adoption of technological solutions and take improvement actions.

Source: Use and appropriation guide - MINTIC

The strategy to be implemented is "formator of trainers", and through which it seeks to develop leadership and skills within each of the ESEs that make up the Public Network of the Department, in aspects related to the use, appropriation, implementation, support First level local, operability, functionality, management and change agent of the solution, so considering the levels of complexity of each of the linked entities and of

According to the annex ⁸ file that reviews the personnel linked to each ESE, it has been established that the first wave of training that is designed for the project is aimed at the training of ESE plant personnel, mainly the person who leads each ESE the technological issue (Leader of the systems area) of the professional or technical level:

Table. ESE allocation criteria for training strategy

Level of Complexity	No. of Plant Persons linked to training
Level III	5
Level II	two
Level I	1

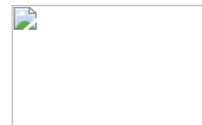
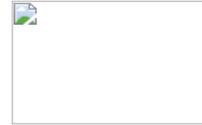
Initially, the technological solution must be socialized with the Managers of each ESE (managerial level and advisor) and they will be immersed in the different functionalities of the project with a minimum duration of (4 hours). One will be conducted process of sensitization and presentation, and with activities and dates specific to the implementation process and management of the solution, also were methodologically inform the process implementation detail, general operation and commitments to the project, which will be convened to the following number of people:

Table. Personnel (Manager and Advisor) by ESE who will be sensitized.

Municipality and ESE	Personal Manager and Advisor
Alcala	3
SAN VICENTE DE PAUL HOSPITAL	3
ANDALUSIA	3
SAN VICENTE FERRER ESE HOSPITAL	3
ANSERMANUEVO	3
SANTA ANA DE LOS CABALLEROS HOSPITAL	3
ALGERIA	3
BOGOTÁ	3
PIO XII ESE HOSPITAL	3
BOLIVAR	3
SANTA ANA ESE HOSPITAL	3
BUENAVENTURA	7
ESE SAN AGUSTIN HOSPITAL	3
LUIS ABLANQUE DE LA PLATA HOSPITAL SOCIAL COMPANY OF THE STATE	4
BUGALAGRANDE	4
SAN BERNABE HOSPITAL, ESE	4
CAICEDONIA	5
ESE HOSPITAL SANTANDER	5
CALI	48
ESE HOSPITAL GERIATRICO Y ANCIANATO SAN MIGUEL	3
MARIO CORREA RENGIFO DEPARTMENTAL HOSPITAL	4
VALLEY UNIVERSITY PSYCHIATRIC DEPARTMENTAL HOSPITAL	4
THAT	4
ISAIAS DUARTE CANCINO ESE HOSPITAL	4
University Hospital of the Valley "Evaristo Garcia" ESE	6
LADERA HEALTH NETWORK SOCIAL COMPANY OF THE STATE	4
ESE CENTER HEALTH NETWORK	6
NORTH HEALTH NETWORK STATE SOCIAL ENTERPRISE	8
EAST HEALTH NETWORK	5
ESE SOUTHEAST HEALTH NETWORK	4
CALIMA	4
ESE SAN JORGE HOSPITAL	4
CANDELARIA	4
ESE CANDELARIA LOCAL HOSPITAL	4
CARTAGO	5
IPS OF THE MUNICIPALITY OF CARTAGO	5

⁸ Excel file of ESE Human Resource

DAGUA	3
JOSE RUFINO VIVAS ESE LOCAL HOSPITAL	3
THE EAGLE	3
SAN RAFAEL ESE HOSPITAL	3
CAIRO	3
ESE SANTA CATALINA HOSPITAL	3
THE HILL	4
ESE SAN RAFAEL HOSPITAL	4
THE DOVIO	4
SANTA LUCIA ESE HOSPITAL OF EL DOVIO VALLE	4
FLORIDA	5
BENJAMIN BARNEY GASCA HOSPITAL	5
GENEVA	3
ESE HOSPITAL DEL ROSARIO	3
GUACARÍ	7
SAN ROQUE ESE HOSPITAL OF THE MUNICIPALITY OF GUACARI, VALLE	7
GUADALAJARA DE BUGA	4
THAT. DIVINE CHILD HOSPITAL	4
JAMUNDÍ	3
ESE JAMUNDI PILOT HOSPITAL	3
THE TOP	4
SANTA MARGARITA ESE HOSPITAL	4
THE UNION	3
ESE - GONZALO CONTRERAS HOSPITAL	3
THE VICTORY	3
THAT HOSPITAL NUESTRA SEÑORA DE LOS SANTOS	3
OBANDO	two
ESE LOCAL HOSPITAL OF OBANDO	two
PALMIRA	7
THAT RAUL OREJUELA BUENO HOSPITAL	7
MEADOW	3
ESE SAN ROQUE HOSPITAL	3
RESTREPO	two
ESE SAN JOSE HOSPITAL	two
COLD RIVER	3
KENNEDY ESE HOSPITAL	3
ROLLER RING	4
SAN ANTONIO DEPARTMENTAL HOSPITAL	4
SAN PEDRO	3
ESE ULASON LOCAL HOSPITAL TASCÓN QUINTERO	3
SEVILLE	4
ESE SEVILLA CENTENARY DEPARTMENTAL HOSPITAL	4
BULL	3
HOSPITAL SAGRADA FAMILIA ESE	3
TRUJILLO	3
ESE HOSPITAL SANTA CRUZ	3
TULUÁ	eleven
THAT RUBEN CRUZ VELEZ HOSPITAL	5
HOSPITAL DPTAL TOMAS URIBE URIBE	6
ULLOA	3
PEDRO SAENZ DIAZ	3
VERSAILLES	3
ESE HOSPITAL SAN NICOLAS	3
VIJES	two
VIJES LOCAL HOSPITAL	two
I TOUCH	5
ESE YOTOCO LOCAL HOSPITAL	5
Yumbo	6
LA BUENA ESPERANZA DE YUMBO ESE HOSPITAL	6
ZARZAL	4
ESE SAN RAFAEL DEPARTMENTAL HOSPITAL	4
Grand Total	209



The trainings will be carried out to several functional groups, in this sense, the technical personnel of each ESE should be trained to be these, who through the methodology of "formator of trainers" learn the details of the usability of the solution and then be these who are responsible for training and change management within each ESE.

The training is given in days four (4) hours and personnel trained in accordance to the level on which belong, in the following manner: Level I (a person) of the level II (two) and level III (five people) in this case they will be divided into three groups

Taking into account the number of ESE people linked to this training process is as follows:

Table. Training by Level of Care

DEPARTMENT PUBLIC HEALTH SERVICES NETWORK FROM THE VALLEY OF CAUCA				
ENTITY	N °	Staff to Train	Hours of Group Training	Groups or Days
THAT LEVEL III	1	3	4	1
THAT LEVEL II	7	14	4	1
THAT LEVEL I	43	43	4	3
MENTAL HEALTH	1	two	4	1
PEDIATRIC	1	two	4	1

The following table shows for each ESE, the number of people trained:

Table. Plant officials trained by ESE

Municipality and ESE	Officials Trained
Alcala	
SAN VICENTE DE PAUL HOSPITAL	1
ANDALUSIA	
SAN VICENTE FERRER ESE HOSPITAL	1
ANSERMANUEVO	
SANTA ANA DE LOS CABALLEROS HOSPITAL	1
ALGERIA	
PIO XII ESE HOSPITAL	1
BOLIVAR	
SANTA ANA ESE HOSPITAL	1
BUENAVENTURA	
ESE SAN AGUSTIN HOSPITAL	1
LUIS ABLANQUE DE LA PLATA HOSPITAL SOCIAL COMPANY OF THE STATE	1
BUGALAGRANDE	
SAN BERNABE HOSPITAL, ESE	1
CAICEDONIA	
ESE HOSPITAL SANTANDER	1
CALI	
ESE HOSPITAL GERIATRICO Y ANCIANATO SAN MIGUEL	1
MARIO CORREA RENGIFO DEPARTMENTAL HOSPITAL	two
VALLEY UNIVERSITY PSYCHIATRIC DEPARTMENTAL HOSPITAL	
THAT	two
ISAIAS DUARTE CANCINO ESE HOSPITAL	two
University Hospital of the Valley "Evaristo Garcia" ESE	5
LADERA HEALTH NETWORK SOCIAL COMPANY OF THE STATE	1
ESE CENTER HEALTH NETWORK	1
NORTH HEALTH NETWORK STATE SOCIAL ENTERPRISE	1
EAST HEALTH NETWORK	1
ESE SOUTHEAST HEALTH NETWORK	1
CALIMA	
ESE SAN JORGE HOSPITAL	1
CANDELARIA	
ESE CANDELARIA LOCAL HOSPITAL	1
CARTAGO	
IPS OF THE MUNICIPALITY OF CARTAGO	1
DAGUA	
JOSE RUFINO VIVAS ESE LOCAL HOSPITAL	1
THE EAGLE	
SAN RAFAEL ESE HOSPITAL	1
THE CAIRO	
ESE SANTA CATALINA HOSPITAL	1
THE CERRITO	
ESE SAN RAFAEL HOSPITAL	1
THE DOVIO	
SANTA LUCIA ESE HOSPITAL OF EL DOVIO VALLE	1
FLORIDA	
BENJAMIN BARNEY GASCA HOSPITAL	1
GENEVA	
ESE HOSPITAL DEL ROSARIO	1
GUACARÍ	
SAN ROQUE ESE HOSPITAL OF THE MUNICIPALITY OF GUACARI, VALLE	1
GUADALAJARA DE BUGA	
THAT. DIVINE CHILD HOSPITAL	1
JAMUNDÍ	

ESE JAMUNDI PILOT HOSPITAL	1
<u>THE SUMMIT</u>	
SANTA MARGARITA ESE HOSPITAL	1
<u>THE UNION</u>	
ESE - GONZALO CONTRERAS HOSPITAL	1
<u>THE VICTORY</u>	
THAT HOSPITAL NUESTRA SEÑORA DE LOS SANTOS	1
<u>OBANDO</u>	
ESE LOCAL HOSPITAL OF OBANDO	1
<u>PALMIRA</u>	
THAT RAUL OREJUELA BUENO HOSPITAL	1
<u>MEADOW</u>	
ESE SAN ROQUE HOSPITAL	1
<u>RESTREPO</u>	
ESE SAN JOSE HOSPITAL	1
<u>COLD RIVER</u>	
KENNEDY ESE HOSPITAL	1
<u>ROLLER RING</u>	
SAN ANTONIO DEPARTMENTAL HOSPITAL	two
<u>SAN PEDRO</u>	
ESE ULASON LOCAL HOSPITAL TASCÓN QUINTERO	1
<u>SEVILLE</u>	
ESE SEVILLA CENTENARY DEPARTMENTAL HOSPITAL	two
<u>BULL</u>	
HOSPITAL SAGRADA FAMILIA ESE	1
<u>TRUJILLO</u>	
ESE HOSPITAL SANTA CRUZ	1
<u>TULUÁ</u>	
THAT RUBEN CRUZ VELEZ HOSPITAL	1
HOSPITAL DPTAL TOMAS URIBE URIBE	two
<u>ULLOA</u>	
PEDRO SAENZ DIAZ	1
<u>VERSAILLES</u>	
ESE HOSPITAL SAN NICOLAS	1
<u>VIJES</u>	
VIJES LOCAL HOSPITAL	1
<u>I TOUCH</u>	
ESE YOTOCO LOCAL HOSPITAL	1
<u>Yumbo</u>	
LA BUENA ESPERANZA DE YUMBO ESE HOSPITAL	1
<u>ZARZAL</u>	
ESE SAN RAFAEL DEPARTMENTAL HOSPITAL	two
<u>(blank)</u>	
(in white)	
Grand Total	64



Component 2 - Solution of interaction between clinical information systems between the public health network:

One (1) immersed solution is expected as deliverable with 3 elements:

1. An API / middleware for each of the ESEs of the public network .
2. A user master record .
3. A cloud solution to which will access each IPS that do not count with the application for the management of the History Clinic, it should be noted that in this last element database is dedicated for each IPS and therefore, this institution is responsible for the custody of said clinical information .

The following are the most relevant elements of this alternative:

to. Clinical records exchange software

The Solution includes the development of an intermediary software (**middleware / API**) that exposes the information requested by another ESE, for the individual and consensual care of the patient, in such a way that it allows access by providers belonging to the public network of health of the Department of Valle del Cauca to the clinical information of the patient who is given care in another of the points of the Network. This is how access to said records is facilitated from any provider, which reduces the fragmentation gaps of information in order to improve the quality of care but above all, optimize the cost of the service and its opportunity.

The exchange of clinical records between IPS regardless of the HIS, RIS, LIS system that they have implemented, allows to implement a software solution that extracts said clinical records and exposes them on demand for later consultation and may even expose administrative and financial information in the future. relevant to the Department of Department of Health.

It should be clarified that the custody of these records continues to be the responsibility of each lending institution.

The software development life cycle depends largely on whether the traditional approach is followed or approached from an agile perspective. The differences are notable, not only for management, but for the work of development teams. While the first is developed in stages, in the second, these stages are not so easily identifiable. In the case of this implementation, it must be addressed through the life cycle of traditional software development, which can be structured around the following stages:

Requirements survey Interconnection points (API)

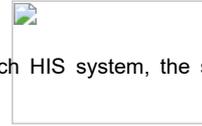
At this stage a diagnosis of the state is performed of the information systems the IPS, and in accordance with the architecture presented in each site is established a list of minimum conditions that allow for interactions between systems of the IPS, the requirements defined both Functional as non- functional.

Interconnection Point Solution (API) Design

According to the requirements obtained raised designs each API or point of interconnection should be one design for each system of information using the IPS, this in order not to invade current architectures providers instead submit a layer intermediate between other APIs and the HIS information system

Development and testing of API interconnection points (API)

Based on the designs, the APIs are implemented according to the requirements of each HIS system, the selected programming languages and the connectors to obtain records of the HIS systems



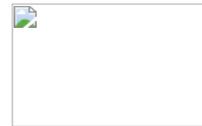
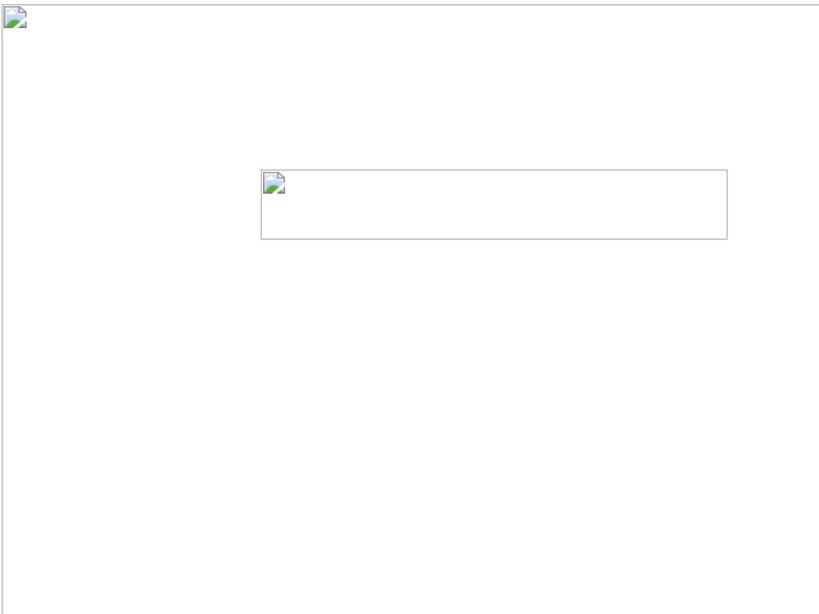
Implementation and validation of interconnection points (API)

Once the software solution for system interaction has been developed and tested, the APIs are implemented in each IPS, this implementation is carried out in IPS segments which use common HIS software.

In this stage the validation of the correct operation of the APIs with each of the HIS information systems is carried out, in order to guarantee the accessibility, integrity and security of the entire system, in addition to validating if it meets the conditions set forth in the requirements. Once this stage is over, it is already considered as definitive start-up.

b. User Master Registration Software

To ensure the chronology of shared clinical information between network public, this alternative provides for the development of one Record Master of User where clinical events users across the network from being indexed, so when HIS system requires historical information of any patient, the latter will search the user master record for the information and return the list of IPSs that have such records, with that list, the requesting HIS can directly consult each place of care and chronologically build the set of care (clinical events), result of medical examinations and other relevant patient information.



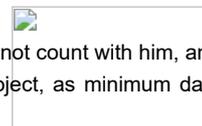
Among the data to be stored in the user master record is: identification document, patient name, date of birth, IPS

attending, Date of care and diagnosis ICD 10, etc. It should be clarified that information on individual clinical events of patients is not saved.

Additionally, it is important to note that this master record is generated report quarterly to the secretarial department of health, on use and frequency of service benefits which will reveal data statistics.

c. HIS software (in the cloud)

Within this activity must be supplied software licensing of the HIS system to the IPS that do not count with him, and also to those whose solution of software does not allow support processes raised and standardized in this project, as minimum data sets or the security conditions for the custody of clinical records .



Given that this functionality is also directed to IPS that do not have to solution HIS that comply with the conditions minimum to interact with other systems in the network of public health and volunteer to migrate to this solution in the cloud, then time of implementation may vary according to the size of the institution and health services offered. In no case may the parameterization and implementation time exceed 3 calendar months .

THE value of the activity related to the "Solution of Interaction between clinical information systems in the public health network of the Valley of the Cauca" includes in its cost the value of the collateral for a year subsequent to the execution of the project.

Component 3:

Technological endowment

Finally, this alternative includes activities related to the provision of infrastructure activities of hardware and connectivity (servers) to strengthen the technological platform of the public health network, as the standardization of processes and procedures must be supported by an infrastructure of servers, networks adequate communications and workstations. In the following numeral the technical characteristics of the equipment to be acquired are specified .

8.2. Technical specifications of goods to acquire

Next, the technical specifications and minimum acceptance conditions of the equipment required for the proper execution of the project are described, so that they respond to the institutional and technological needs in the public health network of Valle del Cauca:

Computer equipment:

Hardware : Minimum processor 3.2 Ghz speed, 4M cache 500 GB hard drive 72000 RPM, 4 GB (1x4 GB) DDR3 1600 MHz memory

Software : Office Home & Business 2016,
Windows 7 Professional 64 with Windows 10 Pro License 3 -3 - 3. Antivirus.
Perpetual leave.

Services : Installation, configuration and use

The allocation of the 200 teams is carried out taking into account criteria of level, size of the ESE and population served; These three variables are the ones that determine the need for equipment allocation, considering also that to guarantee the success of the project, the ESEs must have the latest equipment⁹, which independent of the current installed capacity that is in occupation, requires equipment additional new to this work of capturing and management of information.

Variable size, which is directly related to the level of complexity, is evaluated to starting of the number of beds of hospitalization, Beds observation Consultorios outpatient, Surgeries in the emergency department, tables deliveries, number of units dentistry and operating rooms, when totaling this data, a multiplier factor of 0.10 is applied , then a correction was made taking into account the population served and that in the Municipality of Cali, by its category, ESEs are robust in technology, by which decreased their allocation. Thus, the number of teams to be assigned was determined, also limiting that except for the University Hospital of the Valley, none exceeds the number of 10 teams and none below 1 team, information that is available in the diagnosis. In this way, the number of assigned devices is calculated in the following Table of Computation Equipment Assignment by ESE .¹⁰

⁹ Minimum technical specifications PCs: 2400 MHz, USB 3.0, Realtek 10/100 LAN, 8M Cache, up to 4.20 GHz Core i7 processor or similar; Hard Disk 1TB - 7200 RPM, Ram DDR4 8GB.

¹⁰ Data based on installed capacity in SIHO

Table: Assignment of computer equipment by ESE

Mpio	ESE Name	Hospitalization beds	Observation beds	Outpatient clinics	Consult you in the service of urgencies	Delivery Tables	Number of dental units i	Operating rooms	Grand Total	No. of assigned PCs
Alcala	SAN VICENTE HOSPITAL DE PAUL	9	4	4	1	1	4	0	2.3	two
ANDALUC Ia	SAN VICENTE FERRER HOSPITAL THAT	8	12	4	two	1	3	0	30	3
ANSERMA NEW	SANTA ANA DE LOS HOSPITAL GENTLEMEN	10	3	7	two	two	5	0	29	two
ALGERIA	PIO XII ESE HOSPITAL	10	1	two	1	1	two	0	17	two

BOLIVAR	SANTA ANA ESE HOSPITAL	8	3	5	1	1	4	0	22	two
GOOD NTURA	ESE SAN AGUSTIN HOSPITAL	14	two	3	1	two	1	0	2.3	1
BUENAVENTURA	LUIS ABLANQUE DE LA PLATA HOSPITAL SOCIAL COMPANY OF STATE	31	16	49	two	two	fifteen	0	115	8
BUGALAG RANDE	SAN BERNABE HOSPITAL, ESE	eleven	16	4	two	1	two	0	36	3
CAICEDONIA	ESE HOSPITAL SANTANDER	14	9	8	two	1	4	0	38	5
CALI	THAT GERIATRIC HOSPITAL AND SAN MIGUEL ELDERLY	6	0	two	0	0	0	0	8	1
CALI	DEPARTMENTAL HOSPITAL MARIO CORREA RENGIFO	97	33	10	4	1	1	5	151	8
CALI	UNIVERSITY PSYCHIATRIC DEPARTMENTAL HOSPITAL FROM ESE VALLEY	207	7	13	3	0	0	0	230	8
CALI	ISAIAS DUARTE HOSPITAL ESE CANCINO	40	0	12	0	0	0	4	56	3
CALI	Valle University Hospital "Evaristo Garcia" ESE	394	143	60	3	two	two	10	614	30

Table: Assignment of computer equipment by ESE

Mpio	ESE Name	Hospitalization beds	Observation beds	Outpatient clinics	Consult you in the service of urgencies	Delivery Tables	Number of dental units	Operating rooms	Grand Total	No. of assigned PCs
CALI	LADERA HEALTH NETWORK SOCIAL COMPANY OF THE STATE	12	twenty	74	6	two	Four. Five	two	161	3
CALI	CENTRAL HEALTH NETWORK THAT	fifteen	9	138	5	two	17	two	188	3
CALI	NORTH HEALTH NETWORK	30	18	135	5	1	28	two	219	3
CALI	EAST HEALTH NETWORK	42	twenty-one	245	6	two	58	0	374	3
CALI	SOUTHEAST HEALTH NETWORK THAT	13	8	16	4	1	8	0	fifty	3
CALIMA	ESE SAN JORGE HOSPITAL	eleven	7	4	1	1	5	0	29	two
CANDLE ESTUARY	ESE LOCAL HOSPITAL OF CANDELARIA	17	4	5	4	1	3	0	3.4	3
CARTAGO	IPS OF THE MUNICIPALITY OF CARTAGO	twenty-one	16	40	4	1	10	0	92	3
DAGUA	JOSE RUFINO LOCAL HOSPITAL VIVAS ESE	eleven	6	6	4	1	6	0	3.4	3
HE EAGLE	SAN RAFAEL ESE HOSPITAL	9	two	4	1	1	two	0	19	1
CAIRO	ESE SANTA CATALINA HOSPITAL	12	two	3	1	1	two	0	twenty-one	1
THE HILL	ESE SAN RAFAEL HOSPITAL	fifteen	7	4	4	1	3	0	3.4	3
THE DOVIO	SANTA LUCIA ESE DE HOSPITAL THE DOVIO VALLE	7	0	3	1	1	two	0	14	1
FLORIDA	BENJAMIN BARNEY GASCA HOSPITAL	2.3	8	8	3	1	8	1	52	5
GENEVA	ESE HOSPITAL DEL ROSARIO	9	9	10	two	1	3	0	3.4	3
GUACARÍ	SAN ROQUE ESE DEL HOSPITAL MUNICIPALITY OF GUACARI, VALLE	8	5	7	two	1	4	0	27	3

Table: Assignment of computer equipment by ESE

Mpio	ESE Name	Hospitalization beds	Observation beds	Outpatient clinics	Consult you in the service of urgencies	Delivery Tables	Number of dental units	Operating rooms	Grand Total	No. of assigned PCs
GUADALAJARA DE BUGA	THAT. DIVINE CHILD HOSPITAL	fifteen	4	35	two	1	2.3	0	80	5
JAMUNDÍ	ESE JAMUNDI PILOT HOSPITAL	30	fifteen	17	3	two	9	0	76	4
THE SUMMIT	SANTA MARGARITA HOSPITAL THAT	10	6	3	two	1	3	0	25	two
THE UNION	ESE - GONZALO HOSPITAL CONTRERAS	12	10	7	3	1	5	0	38	3
THE VICTORY	THAT OUR HOSPITAL LADY OF THE SAINTS	12	two	5	1	1	5	0	26	two
OBANDO	ESE LOCAL HOSPITAL OF OBANDO	10	two	4	two	1	5	0	24	two
PALMIRA	ESE RAUL OREJUELA HOSPITAL OKAY	100	30	55	4	1	27	5	222	8
MEADOW RESTREPOR	ESE SAN ROQUE HOSPITAL	16	4	8	3	1	5	0	37	two
COLD RIVER	ESE SAN JOSE HOSPITAL	7	two	4	1	1	3	0	18	two
ROLDANI Llo	KENNEDY ESE HOSPITAL	6	4	4	1	1	two	0	18	two
SAINT PEDRO	DEPARTMENTAL HOSPITAL SAN ANTONIO	28	eleven	eleven	3	1	5	two	61	6
SEVILLE	ESE ULPIANO LOCAL HOSPITAL FIFTH TASCAN	10	4	3	two	two	two	0	2.3	two
BULL	ESE CENTENARY DEPARTMENTAL HOSPITAL OF SEVILLE	30	twenty-one	2.3	two	1	5	1	83	8
TRUJILLO	HOSPITAL SAGRADA FAMILIA THAT	10	4	3	1	1	3	0	22	two
	ESE HOSPITAL SANTA CRUZ	9	0	3	1	two	two	0	17	3

Table: Assignment of computer equipment by ESE										
Mpio	ESE Name	Hospitalization beds	Observation beds	Outpatient clinics	Consult you in the service of urgencies	Delivery Tables	Number of dental units	Operating rooms	Grand Total	No. of assigned PCs
TULUÁ	THAT RUBEN CRUZ VELEZ HOSPITAL	22	14	37	6	two	22	0	103	3
TULUÁ	TOMAS URIBE DPTAL HOSPITAL URIBE	129	27	7	7	1	0	3	174	8
ULLOA	PEDRO SAENZ DIAZ	7	4	3	1	1	two	0	18	1
VERSALLIS	ESE HOSPITAL SAN NICOLAS	9	0	3	1	1	two	0	16	1
VIJES	VIJES LOCAL HOSPITAL	8	5	4	1	1	3	0	22	1
I TOUCH	ESE YOTOCO LOCAL HOSPITAL	7	6	6	two	1	5	0	27	two
Yumbo	LA BUENA HOSPITAL HOPE OF YUMBO ESE	24	17	14	5	1	4	1	66	4
ZARZAL	ESE HOSPITAL SAN RAFAEL DEPARTMENTAL	38	8	12	3	1	8	two	72	6
	Grand Total	1663	591	1156	134	61	397	40	4042	200

Total computer equipment to be provided: 200

Passive connectivity solution :

The purpose of this passive solution is to mitigate the effects caused by incidents that interrupt the continuity of the service such as (accident of deletion of information, introduction of malware, etc.) achieving in record time the recovery of information. For the project is looking to get with the hardware exists and one protocol of copies backup plan backup / restore information, likewise, installing antivirus to protect from malware and licensing of the systems operating those which as scheduled will be updated via repository of updates issued by the manufacturer of the operating system to minimize new vulnerabilities that attack the operating systems of the machines.

In the event of an intermittent or interruption in the service and through the information recovery plan with passive security, the impact of interruptions caused by accident or malware will be minimal through the use of or scheduled backups .

The passive connectivity solution must have the following characteristics:

Hardware: Server with minimum processor 3.2 Ghz / 4core / 8 MB RAM Unbuffered Standard Memory Kit Dynamic Smart Array B140 RAID 0 1 and 5,

Network Card 5720 Dual Port 1 Gb. Intelligent Provisioning (standard), iLO Advanced (optional) Insight Control (optional) DVD RW included, Keyboard and Mouse included Minimum one year warranty on parts, one year on site service.

.Wireless Gigabit Dual Band Router, Minimum 867Mbps in 5Ghz + 433Mbps in 2.4Ghz, 802.11ac / a / b / g / n, Switch 4 Gigabit ports, Button for WPS and wireless network ignition, 2 USB ports, 2 Antennas External Fixed

Software: Linux Server for web cache on 53 servers.

Services: Installation and configuration Linux Server for web cache on 53 servers. Connectivity to computer equipment at all costs. (Installation and configuration).

A passive connectivity solution will be delivered by ESE, for a total of 53 solutions.

8.3 Products

Next, the products that will allow the achievement of the project objectives and that are aligned with the strategies described above are defined. The indicators and goals that allow evaluating the fulfillment of these objectives are also detailed:

Table 9: Project Products

objective	Product	Indicator	Goal	Associated Intellectual Assets
				One (1) document with process definition of the operation model and electronic information management. One (1) document with definition of procedures for capturing and managing information One (1) document with definition of the appropriation strategy of the clinical data interaction schemes.

Articulate the clinical information of the providers that make up the public health network of Valle del Cauca	Technical guidelines documents	Number of documents	4	One (1) document with the information security and privacy plan. Once the product has been successfully completed and has been formally accepted by the beneficiary entities , these documents become the property of each of the ESES.
Increase the capacity for the exchange of clinical information in the public network of health service providers in Valle del Cauca	Management Systems Implementation Service	Number of systems	1	The product includes the development of an intermediate software (middleware) that will be owned by the ESE where it is implemented. Regarding the User Master Registration Software, this becomes the property of the Valle del Cauca Governorate once implemented.
Improve the institutional capacities of the entities attached to the public health network of the Department	Suitable venues	Number of locations	53	The software provided together with the computer equipment has a perpetual license that becomes the property of the ESE once received by the beneficiary institution .

Source: self made

Project Value Chain

The value chain according to the alternative that will allow to solve the problem found includes the following activities:

Specific goal	Component / Product	Activities	Unit of measure	Cant	Unit value	Total
Articulate clinical information among providers that make up the public health network of Valle del Cauca	Technical guidelines documents	Process definition of the electronic operation and management model of information	Number	1	150,000,000	150,000,000
		Definition of requirements for capturing and managing clinical information that impacts the quality of data entry into the system	Number	1	90,000,000	90,000,000
		Definition and implementation of an appropriation strategy for the information systems interaction scheme	Number	1	175,000,000	175,000,000
		Implementation of the computer security plan that guarantees the confidentiality of the information of network users public health	Number	1	670,000,000	670,000,000
		Administration	Number	1	47,263,089	47,263,089
		Audit	Number	1	115,928,331	115,928,331
Increase the ability to exchange clinical information in the public network of health service providers of the Cauca Valley	Management Systems Implementation Service	Enabling integration points in the distribution architecture of the participating applications	Number	1	3,300,000,000	3,300,000,000
		Administration	Number	1	143,749,486	143,749,486
		Audit	Number	1	352,593,080	352,593,080

Specific goal	Component / Product	Activities	Unit of measure	Cant	Unit value	Total
Improve the institutional capacities of entities attached to the network public health	Suitable venues	Implementation of a technological solution for the availability and continuity of the information	Number	53	13,179,245	698,500,000
		Acquisition of computer equipment for institutions attached to the public network of Cauca Valley health	Number	200	5,000,000	1,000,000,000
		Administration	Number	1	181,478,590	181,478,590
		Audit	Number	1	73,987,424	73,987,424
TOTAL PROJECT						6,998,500,000

8.5 Functionality of the solution

There are certain attributes that allow to establish the functionality of a solution and in this case taking into account the characteristics of the project, the following can be considered:

1. Suitability: Ability of the product to provide an appropriate set of functions for tasks and objectives of specified users .

- 2. Precision: ability of the product to provide the correct or agreed results or effects , with the necessary degree of precision.
- 3. Security: Capacity software product to protect information and data so that the people or systems not authorized not to read or modify them , at the time access to people or systems are not denied authorized.
- 4. Functionality compliance: software product's ability to adhere to standards, conventions or regulations in laws and similar requirements related to functionality.

To evaluate the above criteria and verify that all the components of the project (together) operate properly, and in a collaborative way, a pilot test must be carried out that once set in motion, will determine the chances of success of any interaction solution that be subsequently implemented in the institutions of the public health network of Valle del Cauca.

8.6 Sustainability of the project

Among the elements that guarantee the sustainability of the project we can highlight the following:

LEGAL:

Because this project initiative arises as a response to particular needs of the health sector in the Department, whose solution requires a



important technological component; This project is based on the provisions issued by the honorable assembly of the Department of Cauca, such as:

- The ordinance Ordinance 45 of 2016 by which the Departmental Development Plan "The Valley is in You" is adopted
- Ordinance 430 through which the guiding framework is formulated public policy and strategy for the development of information technologies and the communications for one Valley of the Cauca Intelligent and Innovative and in which the objectives set by ICT policy in the health sector in Valle del Cauca and that in its article 4 establishes:
The objectives of ICT policy in the health sector: Implement eHealth to streamline and ensure the capture and quality of the data efficiently and thereby strengthen the safe, timely and reliable exchange of information through electronic means, such as support for the provision of the services of health, the management and processes in generating knowledge and Implement focus groups of objective information and support in making smart decisions and inclusive, encouraging participation for development activities Research, development and Innovation (I + D + i), which allows strengthen the health services and contribute positively to the welfare of citizens with quality and timeliness; Develop programs and tools for knowledge management for training in digital literacy such as Information and Communication Technologies (eSALUD), research and innovation that strengthen the smart and inclusive decision-making processes; and build and apply monitoring and follow-up tools to the implementation of information management processes in decision making

FINANCIAL:

- In the framework of the project is looking to provide to the E.SE of the Department of the Valley of the Cauca, goods and services of a permanent nature, which by their nature,

They are not disposable, nor are they subject to associated operating costs.

- In the characterization of the selected alternative, services have been established that guarantee its operation over time, without generating additional expenses to the beneficiary entities during its execution.
- The value of the activity related to the "Enabling of points of integration into the distribution architecture of the participating applications included in the cost value warranty one year after the execution of the project.

ORGANIZATIONAL:

- The project is considered an activity to define and implement an appropriation plan (change management), whose main objective is to strengthen the competencies of users in the management of this type of technological solutions and thus facilitate and improve their usability.



Taking into account all of the above, it is guaranteed that the Government of Valle del Cauca by the means that the law deems appropriate, designates the necessary and sufficient resources to progressively ensure the operation and operation of the products of the project, as recorded in certification issued by the undersigned Governor of the Department of Valle del Cauca.

9. SCHEDULE

Specific goal	Component /Product	Activities	Month 1	Month 2	Month 3	Month 4	Month 5	6 month	Month 7	Month 8	Month 9	10 month	11 month	12 month
Pre and contractual														
Articulate clinical information among providers that make up the public health network of Valle del Cauca	Operation model and electronic information management	Process definition of the operation model and electronic information management												
		Definition of requirements for the capture and management of clinical information that impact on the quality of input of the system data												
		Definition and implementation of an appropriation strategy for the information systems interaction scheme												
		Implementation of the computer security plan that guarantees the confidentiality of the information of the users of the public health network												
		Administration												
		Project Supervision												
Increase the ability to exchange clinical information in the public network of health service providers in Valle del Cauca	Interaction solution between clinical information systems in the public health network of Valle del Cauca	Enabling integration points in the distribution architecture of the participating applications												
		Administration												
		Project Supervision												
To improve the institutional capacities of the entities attached to the	Technological solution for the continuity and availability of information	Implementation of a technological solution for the availability and continuity of information												
		Administration												
		Project Supervision												



Specific goal	Component /Product	Activities	Month 1	Month 2	Month 3	Month 4	Month 5	6 month	Month 7	Month 8	Month 9	10 month	11 month	12 month
public health network	Provision of computer equipment for institutions attached to the public health network of the Cauca Valley	Acquisition of computer equipment for institutions attached to the public health network of Valle del Cauca												
		Administration												
		Project Supervision												
Closure of draft														

Source: self made

LIFE CYCLE DEVELOPMENT OF *Middleware Software (API)*

Activity	Month 1	Month 2	Month 3	Month 4	Month 5	6 month	Month 7
Survey of requirements	x	x					
Points of interconnection							
Design of solution of point interconnection		x	x				
API development and testing points of interconnection				x	x	x	
Implementation and validation of interconnection points							x



10. RISK ANALYSIS

In the area of risk analysis, the possible scenarios were established in which they may occur, including those that could generate threat, vulnerability, exposed elements. From this, reduction measures are prioritized in the risk and management of disasters to ensure the efficient and effective execution of the project, which according to protocols established in the NTC IEC / ISO31010: 2009 are characterized by: i) qualitative; ii) semi-quantitative and iii) quantitative.

For the determination of the scenarios of risk, its consequences and the measures of management they were taken into account:

- Detailed description of the possible risk scenarios and their probability or of the conditions in which they may occur, making a differentiation of the magnitude and severity of the consequences at the internal level of the facilities / activity and areas of influence that could be affected.
- Analysis of the consequences (social economic and environmental effects)
- Description of measures to treat risk (threat reduction, reduction of vulnerability and development of the plans of emergency and contingency in case of disaster.

In the attached document a more detailed analysis of all possible risk scenarios, causes, rating, effects and treatment actions is presented.

Table 10: Risk Matrix

Item	Type of Risk	Source of Risk	Cause of Risk	Description of Risk	Controls	Actions
1	Operational	Non-objective selection	Lack of provider experience	You do not have access to an organization with experience in designing and deploying an interoperability solution	Check eligibility of the applicant, certificates of education, work experience so demanded by the manual for specific functions and competencies labor force and the requirements of law, by applying the formats:	Appropriate selection of connectivity service providers, technology and contractually committed service delivery levels. Compliance policies based on operating characteristics and quality of service.
two	Administrative	Poor administrative management	Poor definition of the project deployment strategy	Low participation by the Hospital ESEs	Periodic monitoring reports and monitoring of the physical and financial execution of the draft.	Agreement with the entities and prior definition of institutional agreements
3	Operational	Administrative and financial conditions not favorable	Processing delay	Limitations on the acquisition of the required equipment	Periodic monitoring reports and monitoring of the physical and financial execution of the draft.	Redefinition of the project plan, prior approval of the supervision, supervision and SGR.
4	Calendar	Poor administrative management	Lack of commitment of the actors involved	Delays in the management and generation times of the public network of Health	Periodic monitoring reports and monitoring of the physical and financial execution of the draft.	Redefinition of the project schedule, prior approval of the audit, supervision and SGR
5	Administrative	Computer equipment failures	Electrical failure, shock, falls, bad operation and lack of maintenance	Associated problems in the construction of the computer security plan	-Management of objective selection processes, transparent and adjusted to the regulations in force. Monitoring -Reports newspapers, and monitoring of the physical and financial execution of the draft	Compliance policies based on the characteristics of operation and quality of service required.
6	Operational	Network equipment failures	Outdated or insufficient infrastructure	Problems in the infrastructure and operability of the communications system of the departmental network	- Management of objective selection processes , transparent and adjusted to the current regulations. Periodic monitoring reports, and monitoring of the physical and financial execution of the	Compliance policies based on the characteristics of operation and quality of service required.

draft

Source: self made

eleven. PROJECT BENEFITS

Under a functional scenario of interaction between providers, when an institution attached to our public health network requires access to the consultation of a clinical event in another entity (of the same network) of a patient and necessary for the provision of a service that works in another entity, you should not request such information from the user. You must obtain the respective entity through an electronic transmission medium for the exchange of information, without which it generates cost any for the user or entity requesting the information.

The fact that the information systems of the ESE of the Department of Valle del Cauca can have the necessary capabilities to exchange information through the articulators or operators, represents an important technological transformation where in addition to the computer and communications platform, and It is essential to use standards and good institutional practices as well as an objective methodology for short, medium and long term implementation that allows organizations, users and patients to adapt technologically and culturally to the new processes. Which are intended to transform through training facilitators.

They will have identified the following benefits potential to the implementation of this solution technology:

1. Agility and quality of service: By using common information exchange mechanisms, the entity's users can have access to information at all times and through multiple channels, thus allowing them to perceive a higher quality of the service they receive, improving both the relevance and the opportunity of the service.

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2. Reduce costs for entities and the citizen: At present, many entities use folios and paper to transmit information to each other. The exchange of information through electronic mechanisms is a proven alternative to substantially reduce these processes; In addition these costs in many cases are borne by the users who must move to bring test results, orders, summary of stories clinics, etc. from one entity to another. In the same way the cost of services increases being ineffective and affecting the economy of the sector to the often repeat diagnostic aids among others.
3. Security and privacy of the information: is established strategies of protection and custody of information that can not be guaranteed in existing (traditional and non -contact Inter-operant) delivery mechanisms services health.
4. Reusability: a via of the establishment of procedures and models similar to parallel processes in different institutions.



12. ANNEXES

1. PROJECT DIAGNOSIS
2. TECHNICAL SPECIFICATIONS OF GOODS AND SERVICES.
3. BUDGET
4. QUOTATIONS OF GOODS AND SERVICES
5. PROJECT COSTS
6. DISAGREGATED ADMINISTRATION
7. DISAGREGATED INTERVENTORY
8. LIST OF DISTRIBUTION EQUIPMENT COMPUTO

