ITEA Office
High Tech Campus 69 - 3
5656 AG Eindhoven
The Netherlands

T + 31 88 003 6136
E info@itea3.org
W www.itea3.org

ITEA 3 is a EUREKA strategic ICT cluster programme

Exploitable Results by Third Parties

ITEA 10004 – Medusa

Project details

Project leader:	Frank van der Linden
Email:	frank.van.der.linden@philips.com
Website:	http://itea-medusa.eu/

Results related to medical image processing

Name: IntelliSpace Discovery		
Input(s):	Main feature(s)	Output(s):
▪ New MR scanning techniques ▪ New registration / segmentation algorithms	▪ Clinicians performing research need one consistent environment where they can integrate new analysis tools and validate new research workflows. IntelliSpace Discovery offers an innovative way to evaluate the latest analysis methods at the forefront of medical imaging.	▪ Validated algorithms ▪ Validated clinical workflows
Unique Selling Proposition(s):	**Analyze your research data quickly and efficiently** ▪ Import multi-modality data from your PACS and create tailored analysis workflows. ▪ Set up auto processing and batch processing to run in the background for heavy computational tasks. ▪ Export measurements and voxel-based image data to standard file formats, such as Excel®. **Benefit from enriched functionality in additional application packages** ▪ The Research Oncology Suite includes a range of advanced tumor tracking and characterization tools for tissue segmentation. **Evaluate your own research tools in one consistent environment** ▪ Integrate your own tools with the IntelliSpace Discovery image viewer and other applications via the programming interface. **Access updates and additional tools from Philips in one place** ▪ Easily download and install updates and new applications from Philips through the IntelliSpace Discovery Store. **Make the most of your team's budget** ▪ Use just one platform to analyze your multi-modality imaging research data. ▪ Help keep space requirements and hardware to a minimum with simple, Web-based access to the IntelliSpace Discovery server from virtually any PC on your network – and for up to five concurrent users.	

Integration constraint(s):	▪ IntelliSpace Discovery is not for clinical use. It cannot be used for patient diagnosis, treatment selection, and planning.
	▪ IntelliSpace Discovery runs with zero-install client software on almost any modern Windows PC (Windows 7 or later), and up to five concurrent users can be supported.
	▪ Access from the client PC to the IntelliSpace Discovery server will be via a standard Web browser; this includes Internet Explorer 11, and the latest version of Google Chrome.
	▪ IntelliSpace Discovery clients may be connected to the server over:
	  ○ LAN (100 Mbit/s network and above assuming no latency)
	  ○ A home connection via VPN (≥ 5 Mbit/s network enterprise)	

Name: IntelliSpace Discovery	
	with latency below 20ms
Intended user(s):	▪ Academic and medical research
Provider:	▪ Philips Healthcare
Contact point:	▪ Perkuhn, Michael (michael.perkuhn@philips.com)
Condition(s) for reuse:	▪ To download and install the latest research applications from Philips, just visit the IntelliSpace Discovery Store. ▪ A separate license is required for access to some applications on the IntelliSpace Discovery Store.
	Latest update: November 2015

Name: Functional Tumor Segmentation		
Input(s):	Main feature(s)	Output(s):
▪ Functional series from nuclear medicine modalities (TEP, SPECT)	Five semi automatic tumor segmentation methods based on PET or SPECT modalities. In interaction with the user, they lead, from a click initialized by the operator to determine exactly the tumor boundaries within the sampling of images of the modality. ○ This allows the measurement of volume but also to assess tumor activity by calculating the values of SUV mean (taking into account partial volume effect correction), SUV max and SUV Peak associated with each tumor previously segmented.	▪ Validated segmentation methods for clinical purpose ▪ Protocol for method calibration

Unique Selling Proposition(s):	▪ Methods are provided with a calibration protocol (to be performed on a phantom) to ensure the optimal parameters associated with each segmentation method regarding the acquisition machine.
Integration constraint(s):	▪ This package comes as C++ classes and should be integrated as a development part of a software project.
Intended user(s):	▪ Industrial and academic
Provider:	▪ DOSIsoft
Contact point:	▪ Pascal Pineau (pascal.pineau@dosisoft.com)
Condition(s) for reuse:	▪ Commercial licensing

Latest update: November 2015

Name: PF digital slide		
Input(s):	Main feature(s)	Output(s):
▪ Microscopic slide with cell spread or histological slice(s) ▪ Microscope with motorized XYZ stage ▪ Requested digitization parameters (contours of the region to be digitized, objective, filters)	▪ High-resolution (up to 100 Gpixels) image is obtained using inexpensive hardware ▪ The image is stored in a format allowing efficient remote pan&zooom	▪ High-resolution images stored in the pyramidal format optimizing extraction of any sub-image with any resolution
Unique Selling Proposition(s):	▪ **Virtual slide** application on the inexpensive hardware allowing visual diagnostic, image archiving, annotations and traceability. ▪ **High quality images** ○ Automated stitching of tiles (no visible joints on the resulting image ○ Optional z-stacking, resulting in the image in focus everywhere, even for the non-flat preparations	
Integration constraint(s):	▪ Only the binaries (no source code)	
Intended user(s):	▪ Medical, industrial, academic	
Provider:	▪ Imstar SA	
Contact point:	▪ Françoise Soussaline, fs@imstarsa.com	
Condition(s) for reuse:	▪ License from Imstar is required.	
	Latest update: November 2015	

Name: Cell segmentation and classification methods		
Input(s):	Main feature(s)	Output(s):
▪ Microscopic images of the appropriately coloured slices or cell spreads	▪ The cell contours are automatically detected and cells are classified according to the pathology model. Models for cervix, prostate, breast cancer are available (details in the D3x4). ▪ Relevant morphology / densitometry / fluorimetry parameters are evaluated for every cell ▪ Cells classification according to the model (normal/abnormal, positive/negative etc)	▪ Cell countours ▪ Cell feature vectors (quantification results for every cell) ▪ Cell classification

Unique Selling Proposition(s):	▪ **Capacity to automate the in-vitro diagnostic or asses the pharmaceutical essays.**
Integration constraint(s):	▪ The implementation of the methods require use of on an imaging platform including grey level and binary morphology, spectral image transformations and image arithmetics.
Intended user(s):	▪ Industrial, academic
Provider:	▪ Imstar SA
Contact point:	▪ Françoise Soussaline, fs@imstarsa.com
Condition(s) for reuse:	▪ License from Imstar is required.

Latest update: November 2015

Name: AMC		
Input(s):	Main feature(s)	Output(s):
▪ Compression techniques for CTP data ▪ Image processing algorithms for compressed data ▪ Image analysis for stroke patients	▪ Unique compression for currently relevant new imaging technique; ▪ GPU based transfer and processing; ▪ Validated analysis with clinical value;	▪ Optimized image processing workflows; ▪ Quantified analysis of image data of stroke patients
Unique Selling Proposition(s):	▪ Validated on 900+ patients; ▪ Unique compression technique; ▪ Cloud based applications;	
Integration constraint(s):	▪ Only available as a library, needs to be integrated in an image processing environment; ▪ Hardware!	
Intended user(s):	▪ Large industry; ▪ SME; ▪ Integrators; ▪ Clinical researchers;	
Provider:	▪ AMC	
Contact point:	▪ Henk Marquering (h.a.marquering@amc.uva.nl)	
Condition(s) for reuse:	▪ Contact Henk Marquering;	
	Latest update: November 2015	

Name: MedView		
Input(s):	Main feature(s)	Output(s):
▪ Native DICOM image series ▪ Remote compressed *.jp2 series ▪ Uncompressed HU data series	▪ Compression to progressive quality JPEG2000 format ▪ Read remote compressed jp2 series and progressively updating image quality up to lossless while allowing clinician to perform on-line diagnosis ▪ Allow patient data investigation and on-line collaboration for both local native DICOM or HU images series, and remote compressed jp2 series. ▪ Allows automated nodule segmentation, airway segmentation and manual labeling and quantification of other anatomical or pathological structures in the image(s).	▪ Compressed image data as *.jp2 ▪ Uncompressed remote jp2 image series stored as Hounsfield Unit matrices (.hu format) ▪ Segmentation maps, measures, reports.

Unique Selling Proposition(s):	▪ Software license ▪ Participation to collaborative projects
Integration constraint(s):	▪ Windows OS platform ▪ Requires installation of local decoding JPEG2000 server and a remote JPIP server in order to exploit remote data access facilities
Intended user(s):	▪ Medical research
Provider:	▪ Telecom SudParis
Contact point:	▪ Dr. Catalin FETITA (catalin.fetita@telecom-sudparis.eu)
Condition(s) for reuse:	▪ Contact Catalin Fetita

Latest update: November 2015

Results related to security

Name: CymID for Medical Applications		
Input(s):	Main feature(s)	Output(s):
▪ User accounts ▪ User access	▪ Web application managing user account lifecycle through customized validation workflows, role/organisation management and identities provisioning. ▪ Solution managing the workstations authentication of user on Windows or Linux Operating Systems. ▪ CymID integrates WebSSO and/or E-SSO in the system to simplify the authentication stages and reinforce the security of the system.	▪ User accounts managed through workflow ▪ User access to application transparent (Single Sign-On, SSO)

Unique Selling Proposition(s):	**Easier to Manage User account and theirs rights:** ▪ Centralized management in one Web application ▪ Wording and HMI adapted to technical and operational staff. ▪ Powerful Access Rights Models ▪ Self Services: User Portal, yellow/blank pages, change password ▪ Automatic accounts provisioning **Easier to integrate:** ▪ Application wording can be adapted to customer business ▪ Native security implementation ▪ Native SSO integration ▪ Strong authentication on RedHat6 ▪ Support failover availability **Easier to deploy/maintain/update:** ▪ Provides modular RPM packages for RedHat/CentOS ▪ Compliant with deployment tool: Puppet,CFEngine ▪ Provides deployment scripts ▪ Provides Guides/Methodologies
Integration constraint(s):	▪ CymID must be installed on CentOS/RedHat
Intended user(s):	▪ Companies/Systems which require User Management
Provider:	▪ Airbus Defence and Space - Cybersecurity
Contact point:	▪ Adrien Becue (adrien.becue@airbus.com)
Condition(s) for reuse:	▪ Contact Adrien Becue

Latest update: November 2015

Name: CymID for Medical Applications		
Name: “Identity-Based” Stormshield		
Input(s):	Main feature(s)	Output(s):
▪ External user which access a protected network through VPN.	▪ User VPN identity is transmitted to the SSO solution CymID.	▪ External user is authenticated into the SSO solution CymID and can access internal resources transparently.

Unique Selling Proposition(s):	▪ **Security Improved:** o Reduce the attack surface (Authentication server is not exposed). o Allow the use of VPN to secure communication between external users and internal application. ▪ **Transparent for user :** o one authentication on establishing VPN connection
Integration constraint(s):	▪ The SSO solution used must be CymID ▪ Cannot be deploy on Openstack environment
Intended user(s):	▪ Companies/Systems which require to secure external access
Provider:	▪ Airbus Defence and Space - Cybersecurity
Contact point:	▪ Adrien Becue (adrien.becue@airbus.com)
Condition(s) for reuse:	▪ Contact Adrien Becue

Latest update: November 2015

Name: TrustWay Proteccio Quick Start package		
Input(s):	Main feature(s)	Output(s):

▪ Application to be ported
▪ Operating System (Linux based)
▪ Provided software (source code)
  ○ PKCS#11 library
  ○ Linux driver
  ○ Management Application (Java)
  ○ Boot
	▪ PKCS#11 interface
	▪ Application and OS are signed (editor's keys)
	▪ Signature is verified by cryptographic module
	  ○ At each boot of crypto module
	  ○ And before boot of application environment
		▪ Partner crypto appliance

Unique Selling Proposition(s):	▪ TrustWay Proteccio is the only HSM to propose a single security appliance for the combination of a standard server application and a dedicated hardware security module. Its code signing capability ensures the integrity of the application in a trusted end customer appliance.
Integration constraint(s):	▪ Linux
Intended user(s):	▪ End customers
Provider:	▪ Bull, Atos technologies ▪ http://www.bull.com/cybersecurity/hsm-proteccio-OEM
Contact point:	▪ contact.trustway@atos.net
Condition(s) for reuse:	▪ Partner appliance for end customers

Latest update: November 2015

Name: FingerART		
Input(s):	Main feature(s)	Output(s):
▪ A series of medical images to be tracked ▪ A reference database with the fingerprints of the medical images to be tracked ▪ A configuration file specifying the targeted performances	▪ Passive tracking technique (fingerprinting method), uniquely identifying a medical data sequence under constraints of: o Uniqueness o Robustness o Prescribed accuracy	▪ A hit/miss detection answer ▪ The accuracy (expressed according to the user's needs)
Unique Selling Proposition(s):	▪ **Robustness performance**s: The medical data sequence can be tracked even after: o Computer-generated attacks: ▪ Aspect distortion ▪ Content distortion ▪ File format o External camera recording ▪ Print and Scan ▪ PC screen capturing by external cameras ▪ **Re-configurability** o Our solution allows parameter configuration according to the users needs	
Integration constraint(s):	▪ Stand-alone software component	
Intended user(s):	▪ Industrial and academic	
Provider:	▪ Institut Mines-Telecom	
Contact point:	▪ Mihai Mitrea, mihai.mitrea@telecom-sudparis.eu	
Condition(s) for reuse:	▪ Integration in future collaborative projects ▪ Technology transfer from IMT towards industrial partners	
	Latest update: November 2015	

Name: WaterART		
Input(s):	Main feature(s)	Output(s):
▪ A series of medical images to be tracked down ▪ A configuration file specifying the targeted performances	▪ Active tracking technique (watermarking method), uniquely identifying a medical data sequence under constraints of: o Transparency o Robustness o Prescribed accuracy	▪ The identity of the last authorized user in the distribution chain ▪ The area in the image data which were maliciously modified

Unique Selling Proposition(s):	▪ **Robustness performance**s: The medical data sequence can be tracked even after: o Computer-generated attacks: ▪ Aspect distortion ▪ Content distortion ▪ File format o External camera recording ▪ Print and Scan ▪ PC screen capturing by external cameras ▪ **Fragility performances:** o the accuracy level to which the modified areas inside one image are identified o the minimal number of image sin the sequence allowing the modification identification ▪ **Re-configurability** o Our solution allows parameter configuration according to the users needs
Integration constraint(s):	▪ Stand-alone software component ▪ The use of WaterART is restricted to non-diagnosis purposes
Intended user(s):	▪ Industrial and academic
Provider:	▪ Institut Mines-Telecom
Contact point:	▪ Mihai Mitrea, mihai.mitrea@telecom-sudparis.eu
Condition(s) for reuse:	▪ Integration in future collaborative projects ▪ Technology transfer from IMT towards industrial partners

Latest update: November 2015

Results related to cloud computing

Name: NovaForge		
Input(s):	Main feature(s)	Output(s):
▪ User requirements ▪ Users profiles ▪ Source code ▪ Projects	▪ Requirements Management ▪ Tasks Tracking ▪ User and project dashboard ▪ Mailing lists Management ▪ Content Management ▪ Code management	▪ Integrated portal for project management covering the whole application lifecycle: Specification, Development, Integration, Tests, Release ▪ Collaboration enhanced between all the stakeholders.

Unique Selling Proposition(s):	▪ NovaForge is a set of tools integrated into a collaborative platform to manage development projects
Integration constraint(s):	▪ Java ▪ CentOS, RedHat Server
Intended user(s):	▪ Application developers, system administrators, and project Managers.
Provider:	▪ Bull, Atos technologies ▪ https://novaforge.bull.com/portal/public ▪ OW2 Consortium ▪ novaforge.ow2.org/
Contact point:	▪ http://www.novaforge.org/novaforge/contact-info ▪ http://novaforge.ow2.org/wordpress/contact/
Condition(s) for reuse:	▪ GNU Affero General Public License ▪

Latest update: November 2015

Name: High Performance Realtime Cloud (HiPeRT Cloud)		
Input(s):	Main feature(s)	Output(s):
▪ Business and technical components to be deployed ▪ Deployment plan compliant with user requirements ▪ ISO images of the virtual machines ▪ High Performance physical infrastructure ready to use : computers with graphic cards, storage, network,etc.	▪ Set-up a virtualized infrastructure to run the applications ▪ Orchestrate application deployment over the virtualized infrastructure compliant with user requirements ▪ Perform resource scalability and elasticity, on demand	▪ Applications deployed on a virtualized High Performance Infrastructure as a Service according to user requirements ▪ Service endpoints for Cloud Infrastructure Management

Unique Selling Proposition(s):	▪ High Performance Infrastructure as a Service
Integration constraint(s):	▪ OpenStack Havana ▪ High Performance Computers, Storage and Network.
Intended user(s):	▪ System administrators and any user of Cloud Infrastructures
Provider:	▪ Bull, Atos technologies
Contact point:	▪ landry-stephane.zeng-eyindanga@atos.net ▪ frederic.soinne@atos.net ▪ yann.le-floch@atos.net ▪
Condition(s) for reuse:	▪ Private License compliant to Apache License

Latest update: November 2015

Name: Ganglia		
Input(s):	Main feature(s)	Output(s):
▪ High performance infrastructure up and running ▪	▪ Realtime gathering of Metrics on hosts usage ▪ Realtime computing of Statistics on hosts usage ▪ Monitor changes in hosts state ▪ Flexible deployment of new monitoring agents. ▪ Export hosts usage for a given period	▪ Web application UI for System monitoring ▪ Realtime Display of system usage ▪ Display functional and physical views of the system ▪
Unique Selling Proposition(s):	▪ Ganglia is a scalable distributed monitoring solution for high-performance computing systems	
Integration constraint(s):	▪ Apache web server ▪ PHP 5 >	
Intended user(s):	▪ System administrators and any third party users interested in system monitoring, without any technical knowledge on system administration.	
Provider:	▪ Ganglia Community http://ganglia.info/?page_id=68	
Contact point:	▪ Ganglia Support http://ganglia.info/?page_id=68	
Condition(s) for reuse:	▪ BSD License	
	Latest update: November 2015	

Name: Cloud brokering and management component		
Input(s):	Main feature(s)	Output(s):
▪ XML file for REST APIs ▪ Web GUI available	▪ REST API ▪ Contextualization (ssh key pairs) ▪ DevOps tools ▪ Embedded Agent ▪ Firewall policies ▪ LDAP integration ▪ Load balancing/Auto-scaling ▪ Marketplace/Applications management ▪ Network (VPCs, VLANs) ▪ Orchestration ▪ Pricing comparator ▪ Storage ▪ Numerous cloud providers and cloud technologies supported ▪ User interface ▪ Virtual Machine management ▪ VPNaaS (VPN as a Service)	▪ JSON
Unique Selling Proposition(s):	▪ Reusable template for a generic description of the infrastructure ▪ Multi-cloud management and governance ▪ Ability to execute/schedule actions on instances ▪ Agent embedded in each instance for monitoring, supervision, and scripted actions ▪ REST API ▪ Catalog management ▪ Single sign-on access ▪ Graphical visualization of monitoring data ▪ Application life cycle management ▪ Support for porting legacy applications to the cloud	
Integration constraint(s):	▪ Stand-alone component	
Intended user(s):	▪ Application providers to deploy their application on the Cloud ▪ Cloud providers to have a unified management dashboard ▪ Research engineers for automated deployments ▪ Cloud administrators ▪ IT staff ▪ System integrators	
Provider:	▪ Prologue	
Contact point:	▪ Celine BADR KANAAN – cbadr@prologue.fr	

Name: Cloud brokering and management component	
Condition(s) for reuse:	▪ Commercial licence to be negotiated

Latest update: November 2015

Name: Technolution		
Input(s):	Main feature(s)	Output(s):
▪ Number of cloud based applications ▪ Components like security tools, user management, cloud resource management	Framework which combines all separate components into one system: ▪ Scaleable ▪ Secure ▪ Flexible environment: applications can be easily added	Integrated system which offers secure, cloudbased medical applications with a lot of flexibility
Unique Selling Proposition(s):	▪ Very flexible and modular approach: applications can be easily added, or exchanged, for example different user management modules in different countries.	
Integration constraint(s):	▪ Applications included in the framework need to write an interface module to implement the framework interface calls	
Intended user(s):	▪ Large industry; ▪ SME; ▪ Integrators; Not limited to the medical domain, techniques can be used in every domain.	
Provider:	▪ Technolution	
Contact point:	▪ Henk van den Brink (henk.van.den.brink@technolution.eu)	
Condition(s) for reuse:	▪ Contact Henk van den Brink	
	Latest update: November 2015	

Name: zeroDev		
Input(s):	Main feature(s)	Output(s):
▪ A legacy application executable code	▪ Cloud portability for legacy applications developed for fix set-up (PC) ▪ Multi-terminal access for legacy applications ▪ Collaboration functionalities	▪ Access from any terminal through an HTML5 browser ▪ Secure distribution
Unique Selling Proposition(s):	▪ **Cloud portability with no redevelopment**: o any initial OS: unix/windows o any type of application: medical/office/HR ▪ New final user experience: o no installation on the client terminal o multi-terminal o collaboration over non-collaborative application o personalized, secured distribution	
Integration constraint(s):	▪ via uStartapp interface (ustartapp.com) ▪ customizable for private clouds	
Intended user(s):	▪ Industrial	
Provider:	▪ uStartapp	
Contact point:	▪ Bojan Joveski (bojan.joveski@ustartapp.com)	
Condition(s) for reuse:	▪ Pay per use ▪ Licensing	
	Latest update: November 2015	

Results related to decision support

Name: Intelligent Decision Support System for usage in medical and other industries		
Input(s):	Main feature(s)	Output(s):
▪ Sensor data, e.g. blood pressure, respiration rate, heart-beat ▪ Patient data ▪ Image analysis data	▪ ISO proof Medical Protocol Management system called Accolade; this includes a Rule Editor to write rules (algorithms) ▪ Humanly written rules are compiled into machine interpretable code ▪ Rule based data interpretation: in real time, thousands of interpretations per second ▪ Configurable ▪ Cloud based or on-premise	• Alerts for medical experts, calculated by the Rule Engine • Medical protocols

Unique Selling Proposition(s):	▪ Users can compose their own “rule engine” without programming skills, and embed them in a normal medical protocol document. ▪ Integration with Microsoft Office and Outlook ▪ Configurability of the system: metrics, metadata, processes, etc.
Integration constraint(s):	▪ There are no constraints: Accolade and the Rule Engine can work with any standardized data source
Intended user(s):	▪ Large industry for Intelligent Innovation Portfolio Management ▪ Hospitals for Protocol Management and integrated Decision Support, for acute situations (trauma, stroke, cardiac emergencies).
Provider:	▪ Sopheon NV
Contact point:	▪ Huub Rutten huub.rutten@sopheon.com
Condition(s) for reuse:	▪ Per negotiation.

Latest update: November 2015