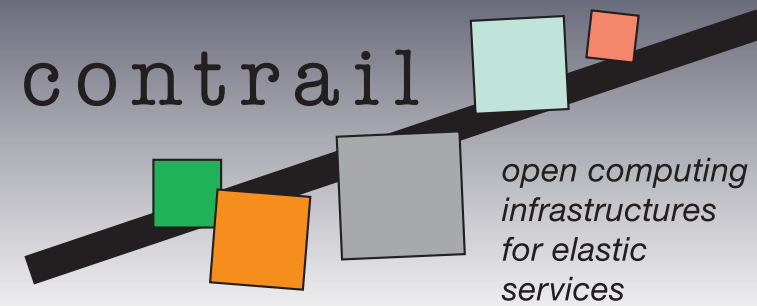




Introduction

Ad Emmen, Genias Benelux bv



contrail is co-funded by the EC 7th
Framework Programme under Grant
Agreement nr. 257438



CONTRAIL vision

- An open source system for Cloud Federations: Linux for the Cloud
- Resources that belong to different operators will be integrated into a single homogeneous Federated Cloud that users can access seamlessly
- Any organization should be able to be both a Cloud provider when its IT infrastructure is not used at its maximal capacity, and a Cloud customer in periods of peak activity
- Leverage and extend the results from the XtremOS FP6 IP project (a Linux-based operating system to support Virtual Organizations for next-generation Grids)

Contrail Consortium

Country/Partner	Research	SME	Industry
France	INRIA		
Germany	ZIB		
Italy	CNR		
			Tiscali
			HP-IIC
the Netherlands	VUA		
		GENIAS	
Slovenia		XLAB	
United Kingdom	SFTC		
		CONST	

Sub-projects and Workpackages

SP5. Use cases and exploitation

SP3. Platform as a Service

SP4.
System
Engineering

SP1. Cloud federation management

SP2. Virtual Infrastructure layer

Sub-projects and Workpackages

1 Project management

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12 Applications and Use Cases

13 Testbeds

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15 Demonstrators

16 Exploitation and technology transfer

SP4. System Engineering

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11 Integration, testing and release management

SP3. Platform as a Service

8 High level services

9 Runtime environments

SP1. Cloud federation management

2 IaaS federation

3 Service level agreements

SP2. Virtual Infrastructure layer

4 Virtual Infrastructure Network (VIN)

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6 Global Autonomous File System (GAFS)

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Sub-projects and Workpackages

SP5. Use cases and exploitation

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SP2. Virtual Infrastructure layer

SP1. Cloud federation management

- Provide cloud management foundations to tie individual resources together into a number of Clouds controlled by different operators aggregated into a single Cloud Federation
- Build interfaces for resource identification, isolation, security, and the translation of quality of service (QoS) requirements of end users
- Exploit and further develop identity management as developed within XtremOS
- Consists of two work packages

WP-2

IaaS Federation

1 Project management

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WP-2 IaaS Federation

- Develop interfaces and mechanisms enabling assembling a federation of Clouds from heterogeneous hardware resources and Cloud providers.
- Define and implement:
 - mechanisms for identity management in federated Clouds
 - abstractions and mechanisms that enable resource policy control and community management across federated Clouds
 - resource selection mechanisms at the Cloud federation level exploiting QoP and SLAs

WP-3 Service level agreements

1 Project management

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WP3 - Service Level Agreements

- Objective: Support for the full life cycle of SLAs
 - Creation, instantiation and enactment of agreements at all levels of the Cloud services stack: infrastructure, IaaS federations, Platforms as a Service
- Approach: SLAs specify the Quality of Service (QoS) and the Quality of Protection (QoP) provided by service providers
 - Availability, performance, security, privacy, ...
 - QoS terms will be defined for infrastructure components such as network, compute and storage, and will be associated with SLAs defined at higher layers in the IaaS federation and PaaS
- Extend the groundwork by FP7 project SLA@SOI

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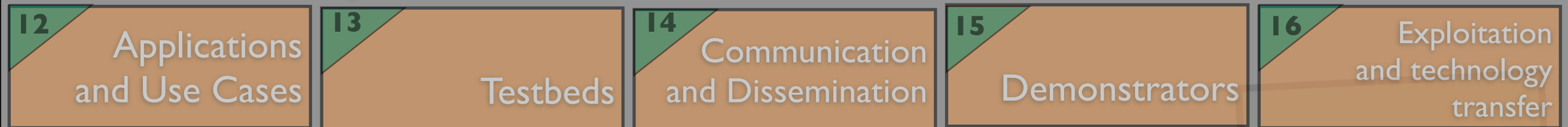
SP 2 - Core Virtual Infrastructure Layer

- Contrail provides a core virtual infrastructure, forming the basis for building secure cloud infrastructures with QoS guarantees that can be negotiated in service level agreements (SLA's)
- This core virtual infrastructure layer revolves around Virtual Cluster Platforms

WP-4 Virtual Infra-structure Network

1 Project management

SP5. Use cases and exploitation



SP4. System Engineering

10 System Architecture

11 Integration, testing and release management

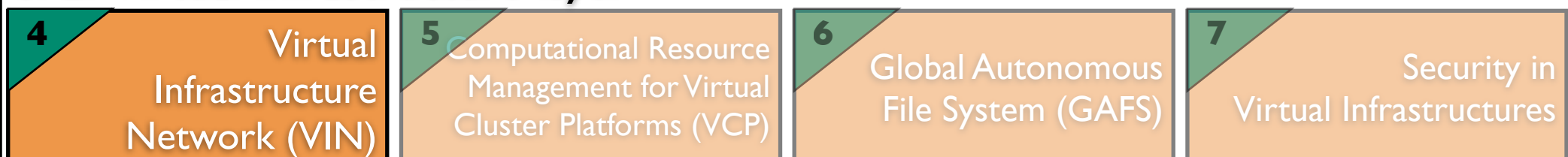
SP3. Platform as a Service



SP1. Cloud federation management



SP2. Virtual Infrastructure layer



WP-4 Virtual Infrastructure network

- Integrate loose infrastructure components into a cohesive, virtual cluster platform with a both secure and efficient virtual network. A virtual cluster securely integrates both file storage (GAFS) and remote client machines
- Authentication is based on Cloud-level user accounts; all communication is encrypted. The VIN serves within a cloud, and extends to other infrastructures (for cloud federation), to the GAFS storage, and to external client machines

WP-5 Computational Management for Virtual Cluster Platforms

1 Project management

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WP-5 Computational Resource Management for Virtual Cluster Platforms (VCP)

- Specify, design and implement the functionalities needed to manage computational resources during the whole life cycle of virtual cluster platforms
- Computational resources need to be managed in such a way to guarantee the QoS of active virtual cluster platforms and to comply with the efficiency policies decided by the cloud providers

WP-6 Global Autonomous File Systems (GAFS)

1 Project management

SP5. Use cases and exploitation

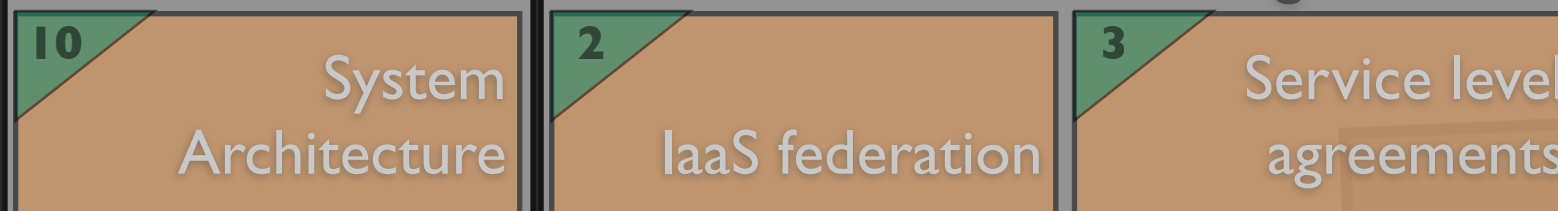


SP4. System Engineering

SP3. Platform as a Service



SP1. Cloud federation management



SP2. Virtual Infrastructure layer



WP-6 Global Autonomous File System

- Provide reliable and distributed file system for users and cloud infrastructure
- Offer users a general purpose Storage-as-a-Service that can be used from within the cloud but also from the Internet
- Provide the storage necessary for operating the Contrail infrastructure

WP-7 Security in Virtual Infrastructures

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WP-7 Security in Virtual Infrastructures

- Design and implement the set of services that guarantee a secure operational environment of virtual infrastructures
- Centralisation of data means the risk of insider threats from within the Cloud provider is a significant concern
- Cloud models as IaaS and PaaS create differing trust boundaries that must be accounted

Sub-projects and Workpackages

SP5. Use cases and exploitation

SP3. Platform as a Service

SP4.
System
Engineering

SP1. Cloud federation management

SP2. Virtual Infrastructure layer

SP3 - Platform as a Service

- An important functionality in Cloud computing to offer a wide range of scalable high-level services and runtime environments to simplify application development, deployment and control

WP-8 High level services

1 Project management

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WP-8 High Level Services

- Offer a collection of storage services for typical cloudvapplications from science and industry like data analysis with Map/Reduce or large scale web applications
- These services are a structured data storage, a geographically distributed storage and relational databases

WP-9 Runtime environments

1 Project management

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WP-9 Runtime environments

- Presenting attractive programming models for helping developers to automatically take advantage of the advanced features of the Contrail platform
- Runtime environments automatically offer elasticity, scalability and performance dependability to applications designed according to its design principles.

Sub-projects and Workpackages

SP5. Use cases and exploitation

SP3. Platform as a Service

SP4.
System
Engineering

SP1. Cloud federation management

SP2. Virtual Infrastructure layer

SP4. System Engineering

- Provide a cohesive, overall system design architecture.
- All involved partners collaborate and align their views on the system as a whole

WP-10 System Architecture

1 Project management

SP5. Use cases and exploitation



SP4. System Engineering

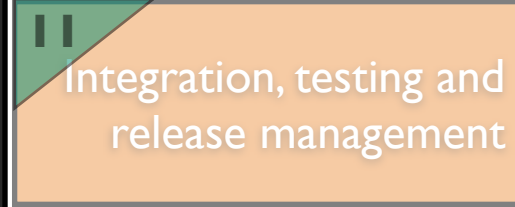
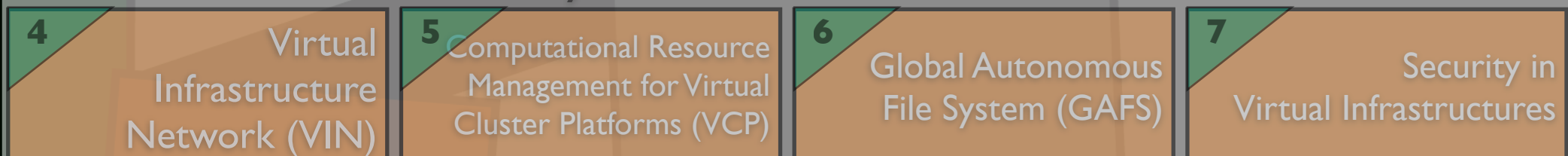
SP3. Platform as a Service



SP1. Cloud federation management



SP2. Virtual Infrastructure layer



WP-10 System Architecture

- Global architecture specification: major components of the Contrail system, interactions between these components
- Detailed specification of the component interfaces
- Component and system evaluation

WP-11 Integration, testing release management

I
Project
management

SP5. Use cases and exploitation

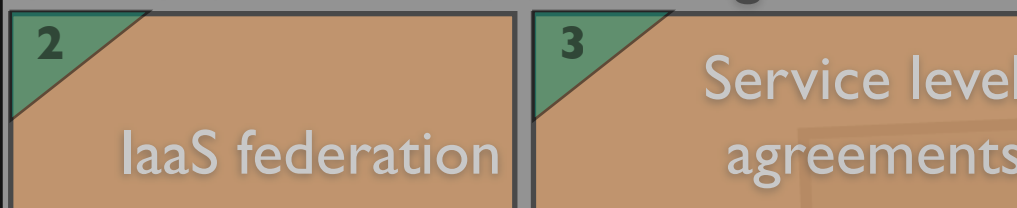


SP4. System Engineering

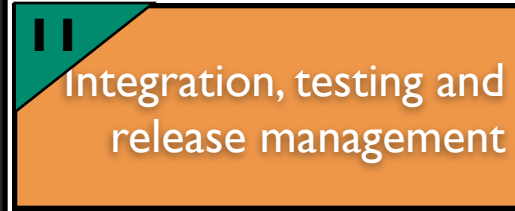
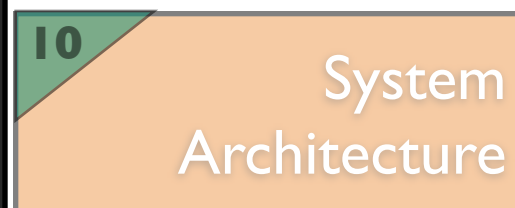
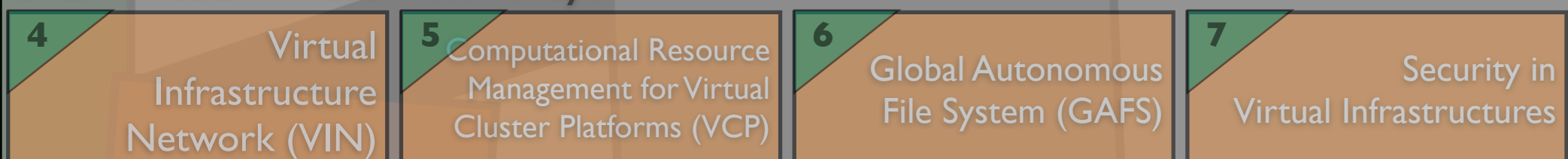
SP3. Platform as a Service



SP1. Cloud federation management



SP2. Virtual Infrastructure layer



WP-11 Integration, testing and release management

- Provide a coherent development environment along with best practice coding rules
- Package all contributions of all software in a coherent, manageable and releasable set
- Test and validate the software packages
- Provide a coherent Linux distribution that will integrate specific project elements and a full featured Linux distribution

Sub-projects and Workpackages

SP5. Use cases and exploitation

SP3. Platform as a Service

SP4.
System
Engineering

SP1. Cloud federation management

SP2. Virtual Infrastructure layer

SP5. Use cases and exploitation

- SP5 steers the project according to proven industrial requirements
- Initiates technology transfer to establish Contrail as a major platform for Cloud Computing.
- Concrete use cases drive the development

Sub-projects and Workpackages

1 Project management

SP5. Use cases and exploitation



SP4. System Engineering

10 System Architecture

SP3. Platform as a Service



SP1. Cloud federation management



SP2. Virtual Infrastructure layer



WP-12 Applications and Use Cases

- Evaluate, test and demonstrate the technology developed through a set of heterogeneous reference applications
- Define use cases, metrics and validations technologies
- Perform experiments and extensive tests on the Contrail system using real applications and report usability issues, improvements/modifications, identify bottlenecks

WP-13

Testbeds

1 Project management

SP5. Use cases and exploitation

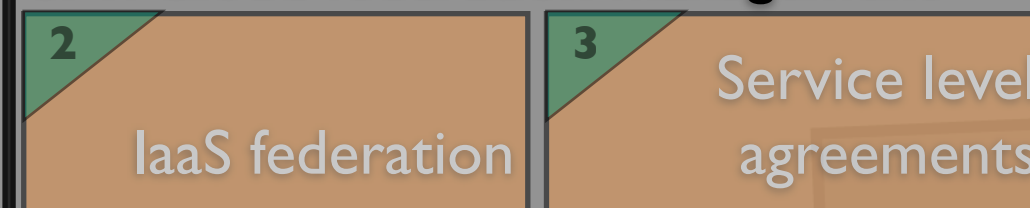


SP4. System Engineering

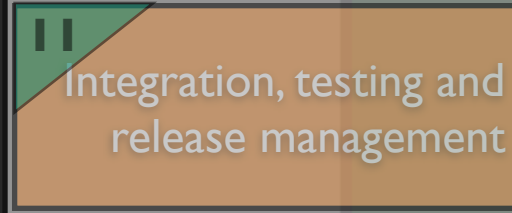
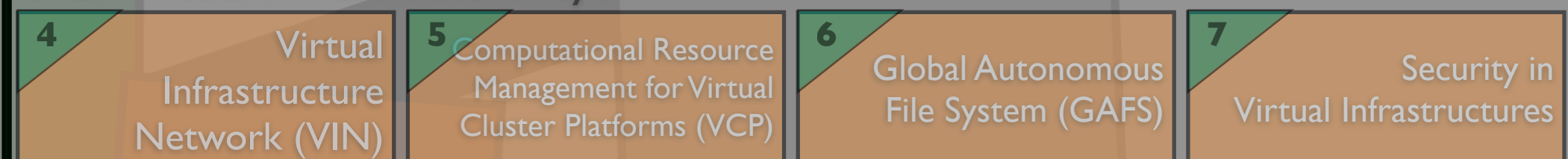
SP3. Platform as a Service



SP1. Cloud federation management



SP2. Virtual Infrastructure layer



WP-13 Testbeds

- Internal testbed: connecting compute nodes provided by some partners is used for software component integration and testing.
- Demonstration testbed: this will run a few selected use cases and will be open to external users through the FIRE portal.
- Validation testbed: the validation testbed will be used for large scale validation of the Contrail

WP-14 Communication and Dissemination

1 Project management

SP5. Use cases and exploitation

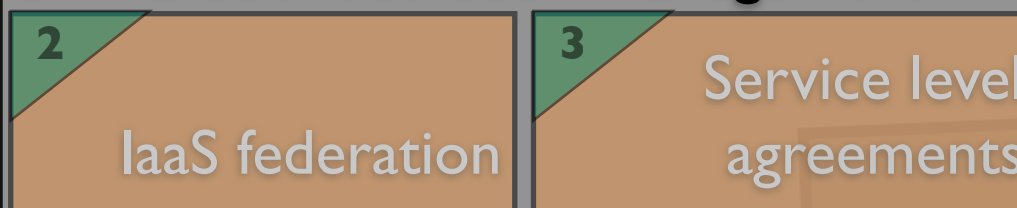


SP4. System Engineering

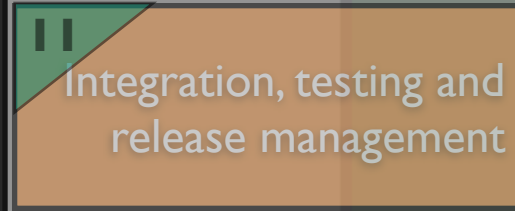
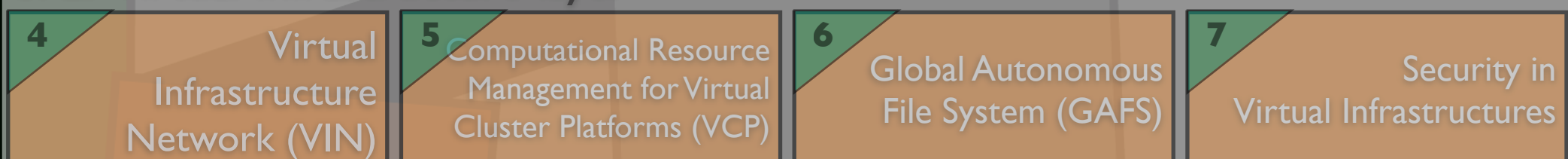
SP3. Platform as a Service



SPI. Cloud federation management



SP2. Virtual Infrastructure layer



WP14 - Communication and Dissemination

- Communication, dissemination, and training
- Training activities will be both internal and external
- Main objectives:
 - Collaboration with ICT IoS Projects.
 - Dissemination of the project results to targeted audiences.
 - Internal and external training

WP-15

Demonstrators

1 Project management

SP5. Use cases and exploitation

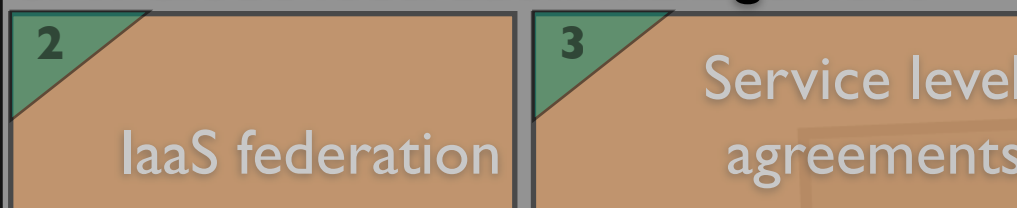


SP4. System Engineering

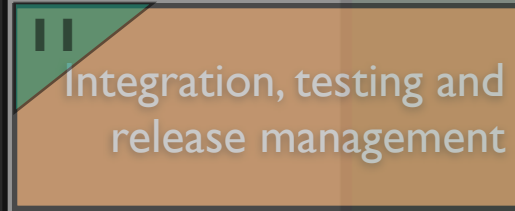
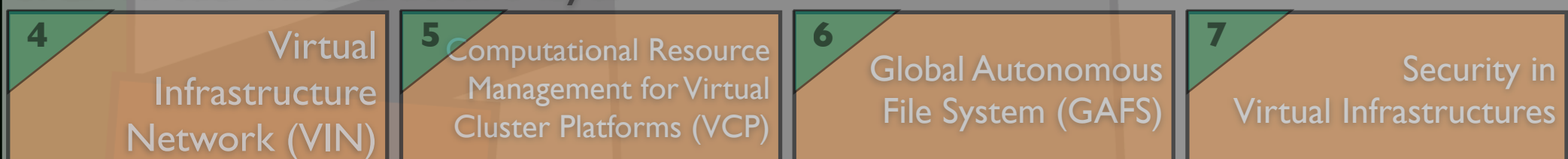
SP3. Platform as a Service



SP1. Cloud federation management



SP2. Virtual Infrastructure layer



WP-15 Demonstrators

- Further expand some of the applications developed transforming them into large scale, market oriented demonstrators fully open to final users
- At the end of the project, the demonstrators will become full featured and almost market-ready applications that can be easily transformed in commercial products by the industrial partners

WP-16 Exploitation and technology transfer

1 Project management

SP5. Use cases and exploitation

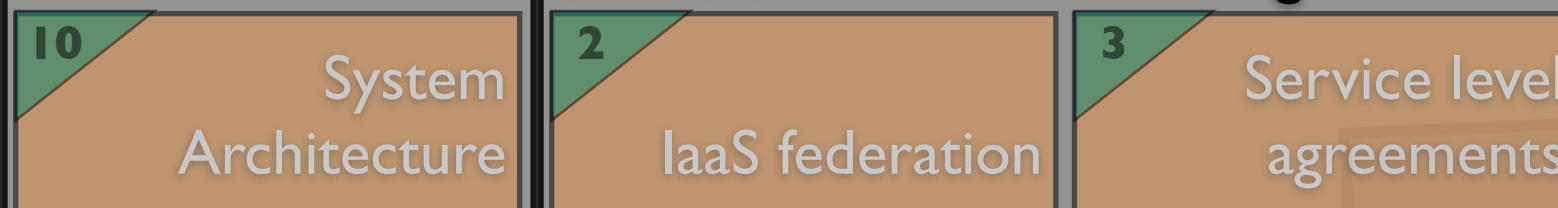


SP4. System Engineering

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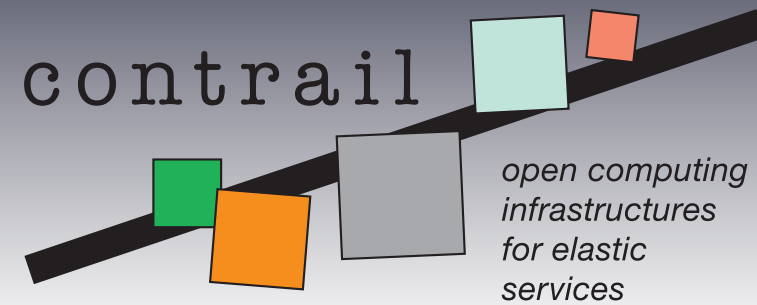


SP2. Virtual Infrastructure layer



WP-16 Exploitation and Technology Transfer

- This work package focuses on exploitation, technology transfer and standardisation



contrail is co-funded by the
EC 7th Framework Programme

Funded under: FP7 (Seventh Framework Programme)

Area: Internet of Services, Software & Virtualization (ICT-2009.1.2)

Project reference: FP7-IST-257438

Total cost: 11,29 million euro

EU contribution: 8,3 million euro

Execution: From 2010-10-01 till 2013-09-30

Duration: 36 months

Contract type: Collaborative project (generic)