Draft Technical Proposal

SA/ETSI/2008-10

2008 ICT Standardisation Action Plan

Application Form

Title: Standardisation of new methodology and Framework for Automated Interoperability Testing of Distributed Systems

Organisation: ETSI

Date: 15th May 2008 (Updated 1st July 2008 (rev 1) and July 15th 2008 (rev 2))

1 Policy relevance

On the market needs for solutions:

As stated in the EC standardisation programme the ESOs are invited to promote the adoption of generic test frameworks of EU standards based on multiple stacks, often including middleware (for example, IMS, GRID, B2B etc.).

This issue is providing evidence that successful testing and interoperability are key factors enabling the use of these technologies and providing all benefits attached to them (EU competitiveness, innovation, etc). However technologies are becoming more and more complex, collaborative, inter-dependant etc. and methodologies and approaches for ensuring interoperability need also to be innovative and take into account new factors such as the distribution of the components, the difficulty to access to components locally due to the distance or the embedded environment. This project intends to adapt solid and proven methods to these new challenges.

On the necessary innovative approaches:

According to the ETSI White Paper "Achieving Interoperability - the ETSI Approach" the current and future eCommunications market can be described as a convergent multimedia market with an increasingly complex structure. Within this market we are faced with an unpredictable, sometimes fragmented, market development (e.g. open network versus walled garden approach, intelligent networks versus dumb networks) where potential barriers to achieving interoperability may be emerging. Additionally, within the present competitive environment, the risk of non-interoperability is increasing because of (e.g.) small windows of opportunity due to fast evolution of technology, or the use of non-open standards.

Against this background there is an ever-increasing awareness of market players and regulators that mass-market development requires interoperability based on open standards. Additionally, the end-user appreciates more choice, but expects certainties.

The main aim of standardization is to enable interoperability in a multi-vendor, multi-network, multi-service environment. The absence of interoperability must not be the reason why final services for which there is great demand do not come into being.

ETSI is very much aware of these developments and market demands. It knows what the inhibitors to interoperability are that can be encountered during the standards development process. A key part of this process is the development of test specifications for conformance and interoperability and the provision of validation services based on many years of experience.

Typical initiatives include:

- an Interoperability Champion (Mr. Hans van der Veer, Alcatel-Lucent);
- specialised bodies for testing such as TC MTS, TC INT and TC TISPAN WG6.

- Specialist Task Forces dedicated to testing, on average 15 per year.
- interoperability events known as Plugtests™ for a wide range of technologies;
- the recently formed Centre for Testing and Interoperability (CTI).

2 Objectives and deliverables

This proposed action will provide **standardised and innovative testing methodologies** to improve interoperability for a broader range of technologies. In particular distributed testing approaches are particularly useful for addressing middleware and software interoperability. These approaches will improve interoperability in the area of **IMS**. They will also be applicable to key technologies such as **GRID** and **B2B** for which interoperability of the platforms on which the relevant applications are running is critical.

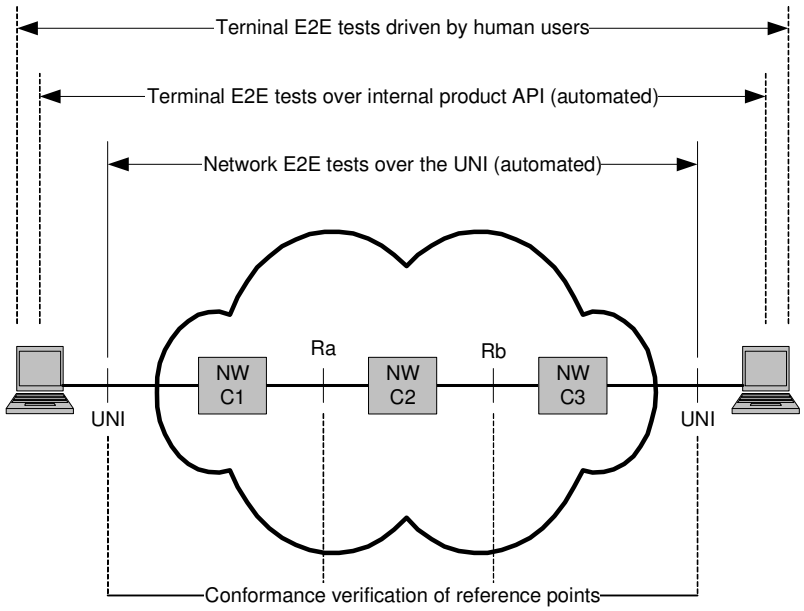
A **trial** based on IMS will be carried out to validate the methodology developed in this project (WP1). Methodologies are only successful if they are well understood and applied and therefore this project will also develop **training materials** supporting the promotion of these approaches. IMS has been chosen as the case study because of the maturity and stability of the standardisation taking place in this area. The lack of coherent pan-European standardisation of GRID and B2B currently makes it impractical to base the case study on these technologies. However, TC GRID (for example) is extremely keen to liaise with the project and to contribute to the review and development of the methodology.

Testing the conformance of every single entity (protocol layer) in a complex system such as those deployed in an IMS network is almost prohibitively expensive. On the other hand, simply performing top-level interoperability tests does not give the required degree of thoroughness. Interoperable systems may still be non-conformant, and vice versa. For example, in a recent study ETSI demonstrated 90% interoperability between systems but with only 60% conformance. In the field, this would undoubtedly lead to interoperability problems.

However, over the past few years a combination of the two approaches is giving promising results: we call this *interoperability testing with conformance verification*. The basis idea is simple: end-to-end interoperability tests are executed while at the same time key reference points (interfaces) are checked to see that the message flow conforms to the reference point standards.

The eventual verdict (pass or fail) is set depending on the outcome of both the interoperability and the conformance criteria.

This is illustrated in the figure below.



The focus of this project is the development of a generic *methodology* for the automated interoperability testing with conformance checking of complex distributed systems such as IMS. The proof of concept of the methodology will be done through a *case study* in the domain of IMS. These case studies are intended to provide a proof of concept in the two different application domains. There is no direct relationship between the two case studies which are intended to be separate case studies for applying the same methodology.

The proposal will build on past activities, as detailed below:

TC INT: Is currently planning the 2nd IMS core network interoperability event. Where possible, it has applied the generic interoperability test methodology EG 202 237 (developed by MTS) in the specific context of IMS. Refinements of the general approach have proven to be successful and appreciated by the IMS community, e.g., conformance checking with interoperability testing. These advances however have so far not been communicated elsewhere in a systematic (standardised) fashion. In addition, IMS interoperability testing has been done manually and not been an automated. Manual IOT analysis has been proven to be very labour intensive and error prone.

TC MTS: Has published a framework for IPv6 testing (similarly as TC GRID has for GRID). In addition, it has generalized this framework for IP protocol testing (EG 202 568**).** This work has concentrated on the high-level methodology and is still missing some practical and technical aspects on how to put the methodology into practice. It does not cover automated testing in any detail. The proposed project will focus on producing a refined version of the EG to ensure that the methodology can be applied in complex real-life situations.

TC GRID: Currently ETSI STF 331 is checking existing standards for interoperability and identifying gaps. They are also developing a testing framework specific to GRID which is expected to facilitate upcoming interoperability events for GRID middleware. This proposed project would align the GRID framework into a general methodology. The proposed project will liaise closely with TC GRID on the methodology and will draw on the experiences gained during the GRID testing framework design (STF 331).

The tested features in the IMS case study will be determined in discussions with TC INT and approved by the Steering Group as the project progresses. As a minimum the features will cover core requirements of 3GPP (IMS rel 7).

In summary: This proposed activity aims to capitalise on past ETSI experience in conformance and interoperability testing and validation expertise by developing a full and coherent generic methodology, framework validated by a prototype IMS case study platform that combines interoperability testing with conformance testing.

3 Expected market impact

The project is of direct interest and relevance to the following ETSI Technical Committees and other bodies.

3.1 ETSI OCG-IOP (Interoperability group)

The proposed project will liaise with the ad hoc OCG-IOP group. The contact person is the OCG-IOP chair Mr. Hans van der Veer (Alcatel-Lucent). OCG-IOP coordinates interoperability initiatives among the various ETSI technical Bodies. It advises the ETSI OCG (Operational Coordination Group) on strategy and approaches to achieving interoperable standards. OCG-IOP supports this initiative as it builds on the OCG-IOP general principles of standards engineering (methodology, validation and tools). OCG-IOP will review the project deliverables in WP 1 and will evaluate the practical application of the methodology through the case study of WP 2. The chair of OCG IOP will be on the project steering group.

3.2 ETSI TC INT

The project will liaise with TC INT (IMS Network Testing). The contact person is the TC INT chair Mr. Giulio Maggiore (Telecom ITALIA). One of the key activities of TC INT is to develop interoperability test specifications for IMS systems. These tests are executed in IMS interoperability events (Plugtests). Currently the approach is highly manual which is time consuming and prone to error. TC INT will benefit from automated testing techniques. TC INT will contribute to the work with technical expertise including review of the deliverables (mainly WP2). It is anticipated that the case study will be

demonstrated in one IMS Plugtest arranged by TC INT. At least one member of TC INT will be on the project steering group.

3.3 ETSI TC MTS

The project will liaise with TC MTS (Methods for Testing and Specification). The contact person is the TC MTS chair Prof. Dieter Hogrefe (University of Gottingen, Institut fur Informatik). The TC MTS guide EG 202 237 TC MTS defines a generic methodology for interoperability testing. However, the potential for *automating* the methodology is not fully developed in EG 202 237. This project intends to fill that gap and TC MTS sees this as a valuable addition to its set of best working practices on testing and validation. TC MTS will contribute to the work with technical expertise including review of the deliverables (mainly WP 1). At least one member of TC MTS will be on the project steering group.

3.4 ETSI TC TISPAN (NGN) WG6

The project will liaise with TC TISPAN WG6 (NGN Testing). The contact person is the WG6 chair Mr. Martin Brand (Telekom Austria TA AG). TISPAN WG6 addresses testing of NGN protocols and services. TC TISPAN WG6 will monitor this project to evaluate the applicability of the methodology in the context of NGN. WG6 will review the project deliverables in WP 1 and will track the success of the case study as defined in WP 2. The chair of TC TISPAN WG6 will be on the project steering group.

3.5 ETSI TC GRID

The proposed project will liaise with TC GRID. The contact person is the TC GRID chair Mr. Michael Fisher (BT Group PLC). TC GRID is currently working on a common understanding of what GRID means to ETSI members. In addition, they are surveying current available standards, identifying standardization gaps and developing a high-level testing framework. In this context, this project proposal for harmonised methodology for interoperability testing is critical. TC GRID will contribute to the review of WP1. At least one representative of TC GRID (or from the TC GRID STF) will be on the project steering group.

3.6 The B2B Community

The project will liaise with the B2B community, principally through the Global (B2B) Testing Network project. Contact person is John Ketchell (CEN).

3.7 TETRA Association

The project will liaise with the TETRA Association. The contact person is Mr. Harald Ludwig chair of the TETRA Association Technical Forum. Currently the certification of TETRA terminals involves the manual execution of interoperability tests of each terminal device against several different TETRA infrastructures. This is time-consuming and expensive. Automating this process would have real benefits for the industry and the rollout of interoperable TETRA systems. The TETRA association looks forward to evaluating the results of this project to see if they could be adapted to TETRA interoperability testing.

3.8 WiMAX Forum

The project will liaise with the WiMAX Forum. The contact person is Mr. Mark Lipford, chair of WiMAX NWIOT. The WiMAX Forum is putting significant effort into building interoperability testbeds based on TTCN-3 (a prototype of which is located at ETSI HQ). The Forum supports this project because it will harmonise the use of TTCN-3 to test the interoperability of complex systems. While the IMS case study is not of direct applicability to the Forum the generic methodology and the proof of concept will be of real benefit and may impact the approaches taken by WiMAX. Conversely, experience of the use of TTCN-3 by WiMAX will be shared with the project.

3.9 Universities and research institutes

University of Gottingen (Prof. Dieter Hogrefe) and CATR/TMC (Chinese Academy of Telecommunication Research/Telecommunication Metrology Centre) will track the work of this project and will review the deliverables of WP1.

As identified above, ETSI will work with many committees in order to get solid opinion and needs expressed by the market players. The trials organised within this action will bring even more

feedback.As far as market impact is concerned, results of this action can have tremendous impact in the use and deployment of many of the key technologies that the EU is promoting.

One major issue in the deployment of a particular technologies or services for the users (e.g. xDSL, UWB, RFID, IMS, applications) is the capability to test, validate and, finally, to ensure end-to-end interoperability.

One of the most important aspects for helping industry to benefit from a technology or services enabled by them is to get good and accurate standards This is the reason why SDOs, supported by DG ENTR, are very active to help the relevant market forces.

Unfortunately, for the industry to get the full benefit of a standard, effort should not be stopped at the publication of a particular standard describing the base technology or services. Tremendous effort has to be devoted to the development of test specifications and then test platforms with the same level of quality and accuracy to ensure the final interoperability of the products or services based on the standard. Time and money are critical factors here as, if this part of the full development chain process (conformity to standards, test, validation, etc) is not working, not well organised, very expensive, then the interest for the technology can be reduced and at the end investment could be wasted. For instance, today there are a lot of GRID technologies and services but one can wonder if the validation and test capability of such services are developed enough to ensure full confidence and give full benefit of investment made in this area.

In other words, not only standards are important, capability of providing full solutions: standards, test specification, test platform in a timely and cost effective manner is key to the successful promotion and deployment of a technology.

ETSI over 20 years has already been at the origin of many success stories where standards have been successfully developed using methodologies and approaches (e.g. GSM, DECT, WiMAX) which also allow efficient and cost effective development of the full solutions (TTCN complier in the GSM environment). Recently ETSI added a new success story with the development of important IP protocols (IPv6) test cases using ETSI approaches complemented by results of an FP6 project (GO4IT) developing free and easy solutions to implement the test cases. A full solution was delivered to the market.

This proposed action will continue by providing a **tool kit** of solutions helping to develop, in a cost effective and timely manner, different test platforms in a broader range of new domains such as in GRID, Automotive, the Internet of Things, etc. **Market impact is therefore very high**

To cover a lot of technologies past and future, new standardisation activities of innovative test methodologies must be carried out in order to address new challenges brought by these new domains such as with distribution and remote aspect of components.

Part II - Execution of the work

5 Working method/approach

The work will be done by an ETSI STF (Specialist Task Force) working together with the ETSI CTI (Centre for Testing and Interoperability). A Steering Group (SG) comprising stakeholders from at least the OCG-IOP, TC INT, TC MTS, TC TISPAN and TC GRID will be formed. The STF will provide monthly reports to the Steering Group. Monthly conference calls will be held. Face-to-face meetings will occur in connection with the relevant TC meetings.

The following base standards/RFCs are applicable to this proposed project:

- ISO/IEC 9646 Parts 1-7: Conformance Testing Framework and Methodology
- EG 202 237: Generic Approach to Interoperability Testing
- ES 201 873 Parts 1-6 Version 2 (also published as ITU-T Z.140 series): TTCN-3

Experts in the STF will be expected to have a mixture of the following skills:

- expert knowledge of protocol testing (conformance and/or Interoperability testing);
- expert knowledge of TTCN-3 (both language and tools);
- good knowledge of software engineering techniques;
- good knowledge of ISO/IEC 9646 and EG 202 237.

The experts will be recruited under the normal ETSI procedures.

6 Performance indicators

ETSI will provide information that will act as performance indicators against this activity in the following cases.

6.1 Effectiveness

Details of the number of participants in project activities (at all levels including the Steering Group) and Plugtest participants.

- the number of meetings held in relation to this work:
- the number of participants and a breakdown by category;
- the number of presentations made on the activity;
- an evaluation of any feedback received
- project progress in relation to the schedule specified in the proposal.

6.2 Stakeholder engagement

An analysis will be given of the balance of stakeholder representation in the project and the number of liaison activities performed (especially at the Technical Committee level).

6.3 Dissemination of results

Information will be provided on the effectiveness of activities related to the dissemination of project deliverables and efforts made to raise industry awareness of the activity. Stakeholders will make every effort to contribute to relevant conferences/workshops to disseminate the project results.

The project will participate in at least one workshop and at least one Plugtest™ event. Target workshops are any that deal with protocol testing, e.g., Testcom or TTCN-3 User Conference. Plugtests are one IMS interoperability event organised by ETSI in 2009 or 2010 (as a TC INT activity).

6.4 Impact

Information will be provided on the satisfaction of the stakeholders with the progress and outputs of the project. This will be collected at Steering Group meetings, plenary meetings of OCG-IOP, TC INT, TC TISPAN, TC-MTS and TC GRID.

6.5 Benchmarking/results

The following benchmarks will be applied:

- Number of case study tests produced (5 -1 0).
- Number of case study tests executed against an SUT (5-10).
- Time/cost saved vs manual testing.
- Degree of automation in test production as well as test execution.
- Plugtests supported/attended (1-3).
- Number of TC meetings attended.
- Releases of prototype test systems for case studies (at least 1).

7 Work plan, milestones and deliverables

This project proposes 3 Work Packages (WP):

- WP1: Methodology and Framework
- WP2: Trial Implementation

- WP3: Training Package

7.1 WP1 - Methodology and Framework

Work Package 1 defines a *generic* methodology and framework for automating interoperability testing and complementing it with conformance verification. Special consideration will be given to aspects of distributed systems (e.g., GRID and IMS). While there will be many new elements to this framework it will build on the successful standardised methodologies for conformance testing [ISO 9646] and interoperability testing [EG 202 237].

The participating ETSI Technical Committee in WP1 is TC MTS (Methods for Testing and Specification).

The tasks and deliverables are summarised in the following table:

Work Package 1		
#	**Task Name**	**Deliverable**
T1.1	Pre-study	n/a
T1.2	Methodology and Framework	D1.1

7.2 WP2 - Trial Implementation

The methodology will be validated by an IMS case study related to actual ongoing standardisation in a TC INT. WP2 will define some sample test cases written in the standardised test specification language TTCN-3 (Testing and Test Control Notation version 3) [ES 201 873]. In order that these trial tests may be executed in a real environment (i.e., against real equipment) prototype adaptation layers will be developed, together with the necessary message encoders. Where possible, this will be based on open source software. Finally, the tests will be made available for use in an ETSI Plugtest™ event for evaluation.

The participating ETSI Technical Committee in WP2 will TC INT (IMS Network Testing).

The tasks and deliverables are summarised in the following table:

Work Package 2		
#	**Task Name**	**Deliverable**
T2.1	Architecture design	D2.1
T2.2	Sample test purposes	D2.1
T2.3	Sample test cases	D2.1
T2.4	Adaptation layers	D2.2
T2.5	Message encoders	D2.3
T2.6	Participation in suitable Plugtest event	n/a
T2.7	Experience (Plugtest) report	D2.4

7.3 WP3 - Dissemination and Training Material

Disseminating the results and educating the standardisation and implementer communities on the methodology and approach taken by ETSI is a key part of this project. Work Package 3 will develop a complete set of dissemination and training material based on ETSI's knowledge and experience of best working practices. It will provide a White Paper summarising the methodology and the practical results of the Plugtest event. WP3 will also provide a training package comprising the methodology, and its application in various fields. Aspects of distributed systems, such as GRID, will be included. It will present testing and validation strategies and issues related to tool support. Use of languages such as TPLAN for test purposes and TTCN-3 for the test scripts will be covered. The production of complementary documentation such as PICS/IFS (protocol and/or interoperability checklists) and result reports will also be addressed. The material will be based on PowerPoint slides but other electronic teaching methods may be considered if resources allow.

The tasks and deliverables are summarised in the following table:

Work Package 3			
#	**Task Name**	**Deliverable**	**EC Resource**
T3.1	White paper	D3.1	15
T3.2	Training package	D3.2	60
	TOTAL		**75**

7.4 Workflow and Milestones

The following table summarises the main WP time flow and milestones. It assumes an18 month duration. The milestone due dates are the number of weeks elapsed following the start of project).

The Interim Report detailing the activity performed and scheduled along with the latest drafts of the deliverables is scheduled to be provided 11 months after the date of signature (S + 11).

The Final Report providing details on the activities performed, copies of the published deliverables and other material plus the report on the performance indicators will be provided 20 months after the date of signature (S + 20).

Final Milestone		*TC approved*	
Intermediate Milestone		*Drafts*	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
WP1					M1		M2																	
WP2									M3				M4					M5						
WP3												M6						M7						

7.5 List of Deliverables

The following table lists the deliverables. The ETSI types are **EG** - ETSI Guide and **TR** - Technical Report.

List of Deliverables			
#	**Description**	**Milestone**	**Type**
D1.1	Methodology and framework	M1, M2	EG
D2.1	Test architecture and specification	M3, M5	TR
D2.2	IMS adaptation layers	M4, M5	Software
D2.3	IMS codecs	M4, M5	Software
D2.4	Plugtest report	M6, M7	TR
D3.1	White paper	M6, M7	Paper
D3.2	Training package	M6, M7	Misc

Deliverable D1.1: An ETSI Guide (EG): “Methodology and Framework for Automated Interoperability Testing”. The absolute minimum requirement is that the methodology shall be applicable to IMS and GRID. This document will describe a methodology based on the best working practices of EG 202 237 extended to include automation. Of particular interest will be proposals for harmonising the understanding of generic testing architectures of distributed systems (access to reference points, synchronisation issues, assignment of test verdicts etc.). Recommendations for the use of TTCN-3 will be developed.

Deliverable D2.1: An ETSI Technical Report (TR) “Specific Architectures for Automated Interoperability Testing” proposing an actual architecture based on the generic framework as applied to IMS. This TR will also include sample test cases in TTCN-3 which will be used on the prototype tool package to demonstrate the feasibility of the approach to IMS in the real-life situation of an IMS interoperability event.

Deliverable D2.2: In order to execute the case study adaptation layers interfacing the TTCN-3 test drivers (system) to the underlying System Under Test (SUT) needs to be implemented. The actual implementation case study will be IMS. In this case, the TTCN-3 test system will need at least to access the Mw Interface. The software package (source code and executable module) of D2.2 would include the necessary adaptation layers for IMS.

Deliverable D2.3: TTCN-3 defines protocol messages in terms of an abstract syntax. In a real test system when sending messages this abstract format needs to be converted to the actual messages

(ultimately bit strings). Conversely, when receiving incoming messages as bitstrings these need to be converted to the format (data types) understood by TTCN-3. The software package that does this processing is called the CODEC. Note, that this is not a voice CODEC as commonly used in GSM for example. Deliverable D2.3 will comprise the software package (source code as well as a compiled module) that encodes/decodes the protocol messages according to the relevant SIP-based protocols at the interfaces defined in deliverable D2.1. This software package will include the source code as well.

NOTE: Codecs convert abstract data structures which represent the information exchanged at test system interfaces and used to specify tests into binary encoded messages that are actually exchanged between the test system and the SUT. ETSI has a long history in working in testing with abstract data structures. Working on a more abstract level in test specification allow test engineers to understand information exchanged and target the message information which needs to be assessed to make test verdicts.

Deliverable D2.4: An ETSI Technical Report (TR) summarising these experiences. TC INT holds a yearly IMS interoperability event (Plugtest). The prototype tool will be demonstrated at a suitable event in 2009 or 210 depending on the scheduling of the project and the IMS Plugtest. The benefit for this project is that we will i) be able to try out the tool in a realistic environment against real IMS systems ii) get feedback on the practicality/efficiency of the automated test methodology and prototype software.

Deliverable D3.1: An ETSI White Paper "Experiences of Using TTCN-3 for Automated Interoperability Testing" summarising the methodology of D1.1 in popular terms, showing the relation to GRID and IMS testing and presenting the practical experiences and results obtained in the case study and IMS Plugtest.

Deliverable D3.2: A step-by-step tutorial (introductory course) on the basic principles of interoperability testing, the methodology defined by this project and the real-life experience of the case study. The material will be suitable for both physical presentation (e.g., Powerpoint) or remote presentation (e.g., eLearning).

Part III: Financial part

8 Resources Required

The total estimated action costs are 397 000 €.

The following table summarises the overall total project resource requirements:

Total Costs (WP1+WP2+WP3)		
	Total €	**%**
EC (including travel)	220000	55%
ETSI	177000	45%
TOTAL WP1+WP2+WP3	**397000**	**100%**

8.1 Resources WP1

The following table summarises the WP1 resource requirements:

WP 1				
	Person-days	**Rate (€/day)**	**Total €**	**%**
EC	55	600	33000	
Travel			3000	
Total EC Contribution			**36000**	**57%**
Partner Contribution (ETSI CTI)	15	600	9000	
Contributions in kind	30	600	18000	
Total ETSI Contribution	**45**		**27000**	**43%**
TOTAL WP1	**100**		**63000**	**100%**

8.2 Resources WP2

The following table summarises the WP2 resource requirements:

WP 2				
	Person-days	**Rate (€/day)**	**Total €**	**%**
EC	215	600	129000	
Travel			7000	
Total EC Contribution			**136000**	**57%**
Partner Contribution (ETSI CTI)	40	600	24000	
Contributions in kind	130	600	78000	
Total ETSI Contribution	**170**		**102000**	**43%**
TOTAL WP2	**385**		**238000**	**100%**

8.3 Resources WP3

The following table summarises the WP3 resource requirements:

WP 3				
	Person-days	**Rate (€/day)**	**Total €**	**%**
EC	75	600	45000	
Travel			3000	
Total EC Contribution			**48000**	**50%**
Partner Contribution (ETSI CTI)	15	600	9000	
Contributions in kind	65	600	39000	
Total ETSI Contribution	**80**		**48000**	**50%**
TOTAL WP3	**155**		**96000**	**100%**

8.4 Travel Costs

A total of 6 European and 1 intercontinental travels are anticipated. These are for attending Technical Body (TB) meetings, project meetings and one Plugtest event.

Travel Costs		
#	**Description**	**€**
WP1	TB and project meetings: 2 Europe	3000
WP2	TB and project meetings: 2 Europe, 1 Intercontinental	7000
WP3	TB and project meetings: 2 Europe	3000
	TOTAL	**13000**

8.5 In Kind Contribution

The in-kind contribution is indicated in the relevant estimated financial budget and will follow the provisions of Clause 4 of the "Note for guidance for the implementation of the Framework Partnership Agreement 2004-2007 between CEN, CENELEC, ETSI and the European Commission signed on 11 December 2003 (revised September 2006)".

In-kind contributions will be justified by signed attendance by participants in meetings reviewing and contributing to the planned activity. The information provided will be as agreed in the note for guidance for the implementation of the regulations in relation to voluntary, consensus-based standardisation activity. This in-kind contribution will mainly come from active review and participation of stakeholders

in the Steering Group and meetings of the ETSI OCG IOP Group, TC IMT, TC MTS, TC GRID and TC TISPAN and with other stakeholders outlined in Clause 3 of this Technical Proposal.

The total cost of funding via in kind contribution is 135 000 € (34% of the total action cost) which is calculated as being equivalent to 225 working days at a cost of 600 EUR per day.

8.6 Partner Contribution

As indicated in the tables for the work plans ETSI will also provide a “partner contribution” of 42 000 € towards the total cost of this action. This will be in the form of 70 man-days contribution from the ETSI experts in our Conformance Testing & Interoperability competence centre of the ETSI Secretariat (formerly known as the ETSI PTCC). As the CTI is not covered by the annual Operating Grants received from the EC and EFTA, this contribution is provided at the tariff of 600 € per man-day even though the real salary costs of the experts is above this.

This partner contribution is equivalent to 10,58% of the total action costs.