

END-TO-END TESTING

Using TTCN-3

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Agenda



1 End-to-End Wireless Network Testing

2 Challenges

3 TTCN-3 Based Solution

4 Business Benefits

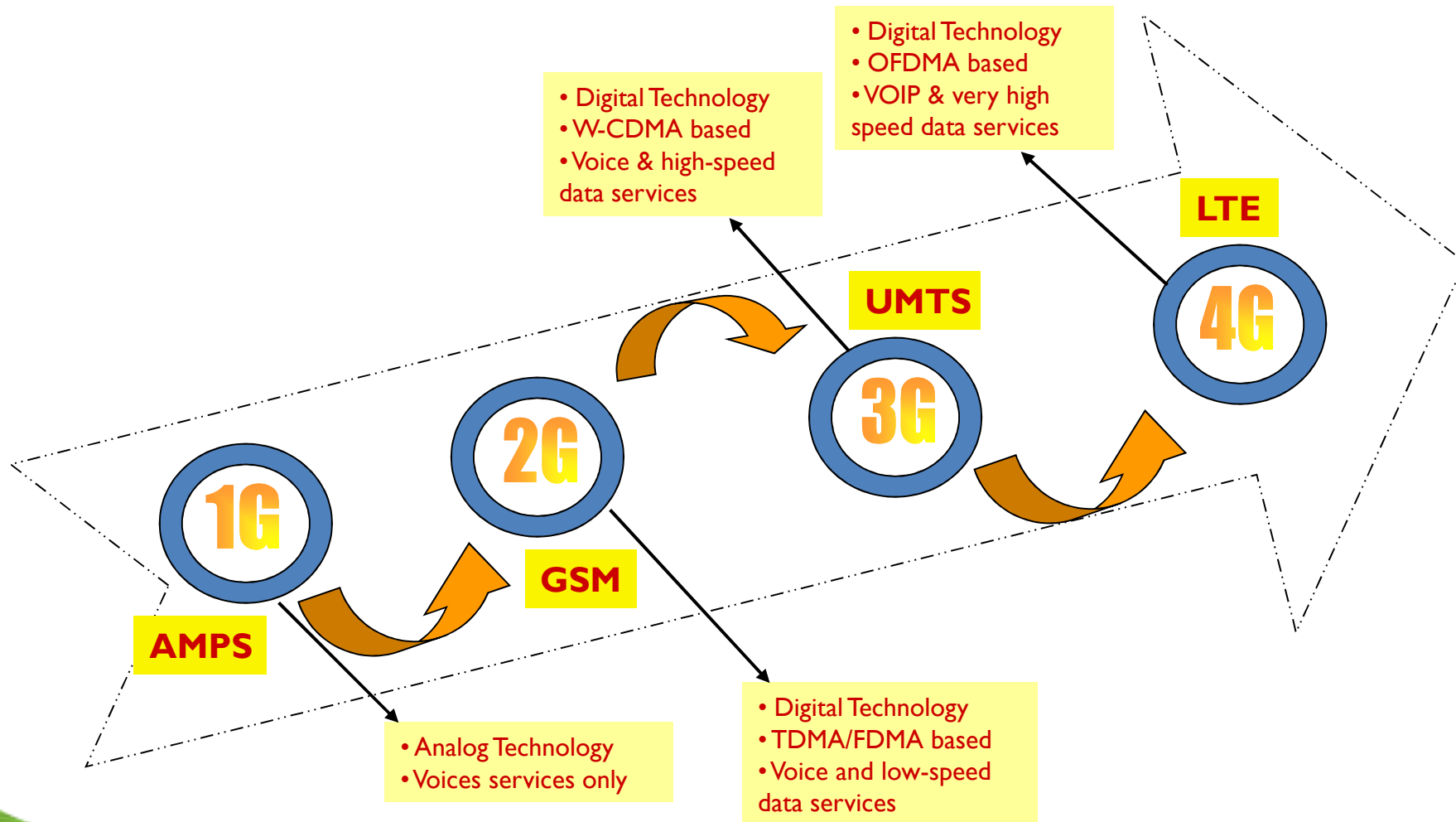


End-to-End Wireless Network Testing

Evolution of Wireless Networks



- The wireless communication industry has been undergoing rapid changes.



Challenges



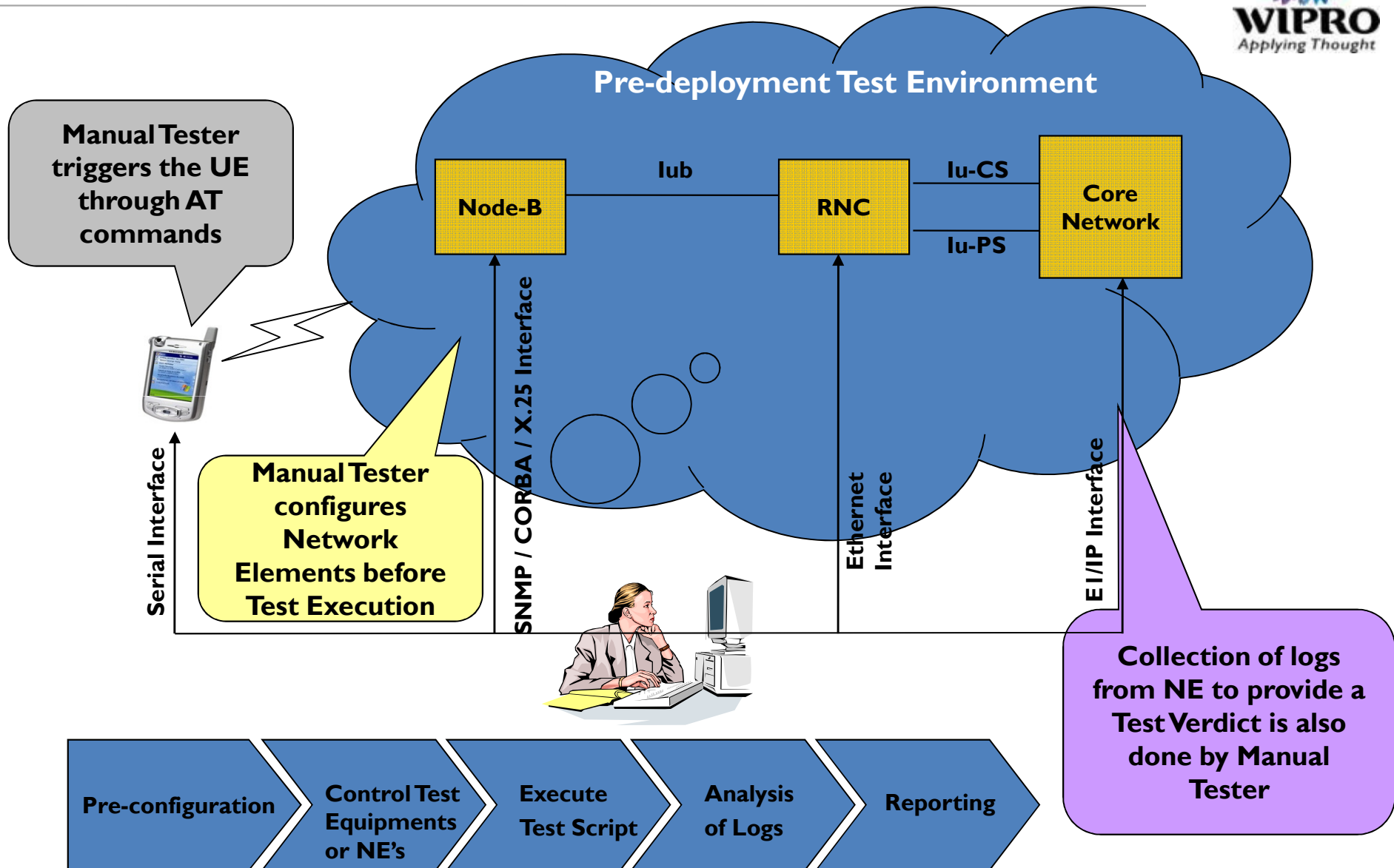
Business Challenges

- Timely introduction of value added services
- Network QoS is maintained
- End-user QoE is comparable & exceeding competitor's networks

Testing Challenges

- Various types of testing need to be executed
- Meeting Time-to-Market constraints
- Testing is manual & time consuming
- Ensuring all services are fully tested and deployment ready

Manual Test Sequence





TTCN-3 Based Automation Solution

Why TTCN-3



Features to support complex telecom protocol/ functional testing

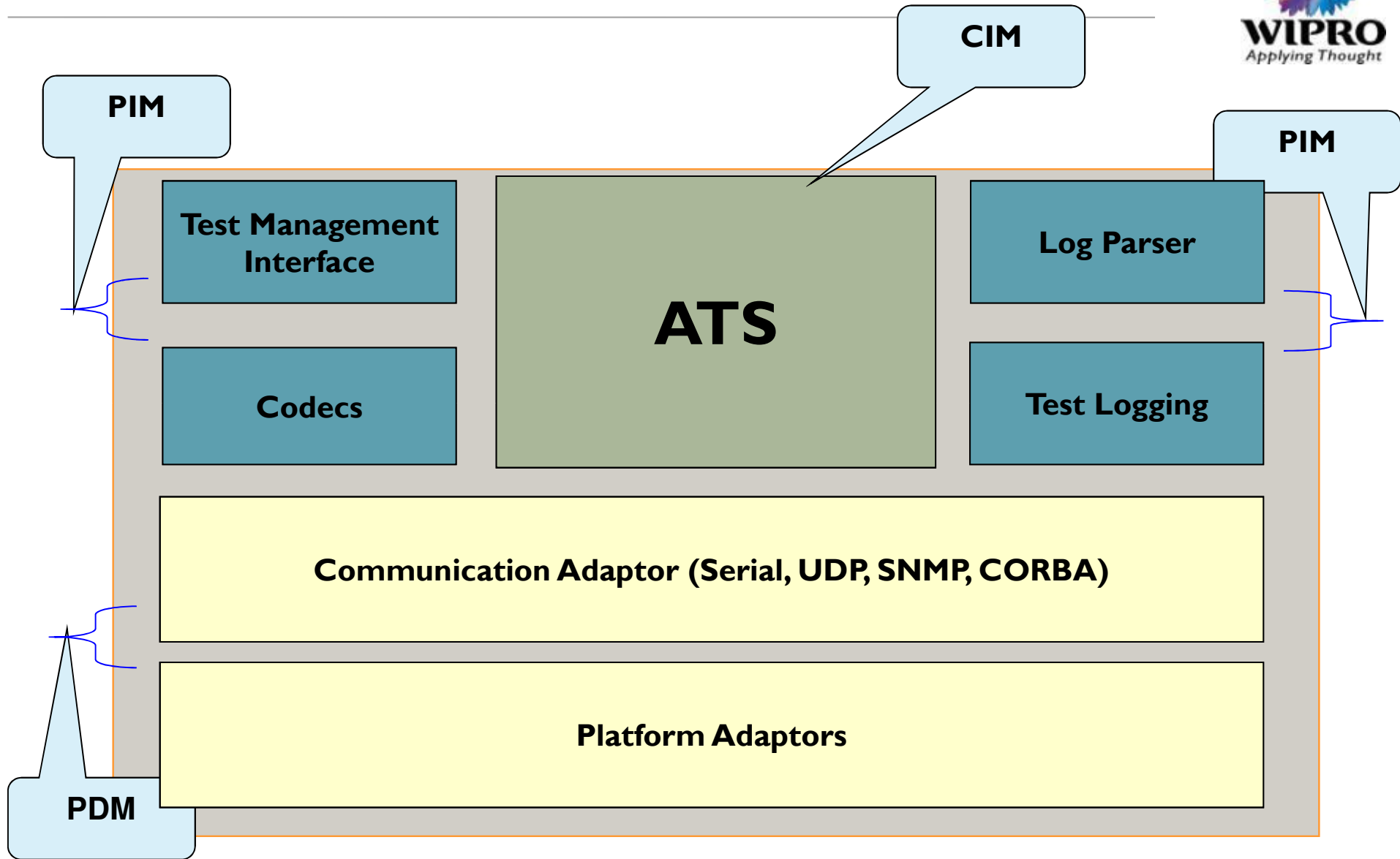
- 1 **Supports Synchronous and Asynchronous communication mechanisms**
 - enables testing of message based and procedure based systems
- 2 **Supports dynamic, concurrent test configurations**
 - enables scalable, adaptable & distributed test setups
- 3 **Supports flexible definition of test data**
 - enables use of data and expected response templates
- 4 **Supports type and value parameterization**
 - enables use of type and behavior definitions in various contexts
- 5 **Supports powerful handling of Test verdicts**
 - Provides tester with variety of verdict management options
- 6 **Combines use of ASN.1 with TTCN-3**

Comparison of Software Economics

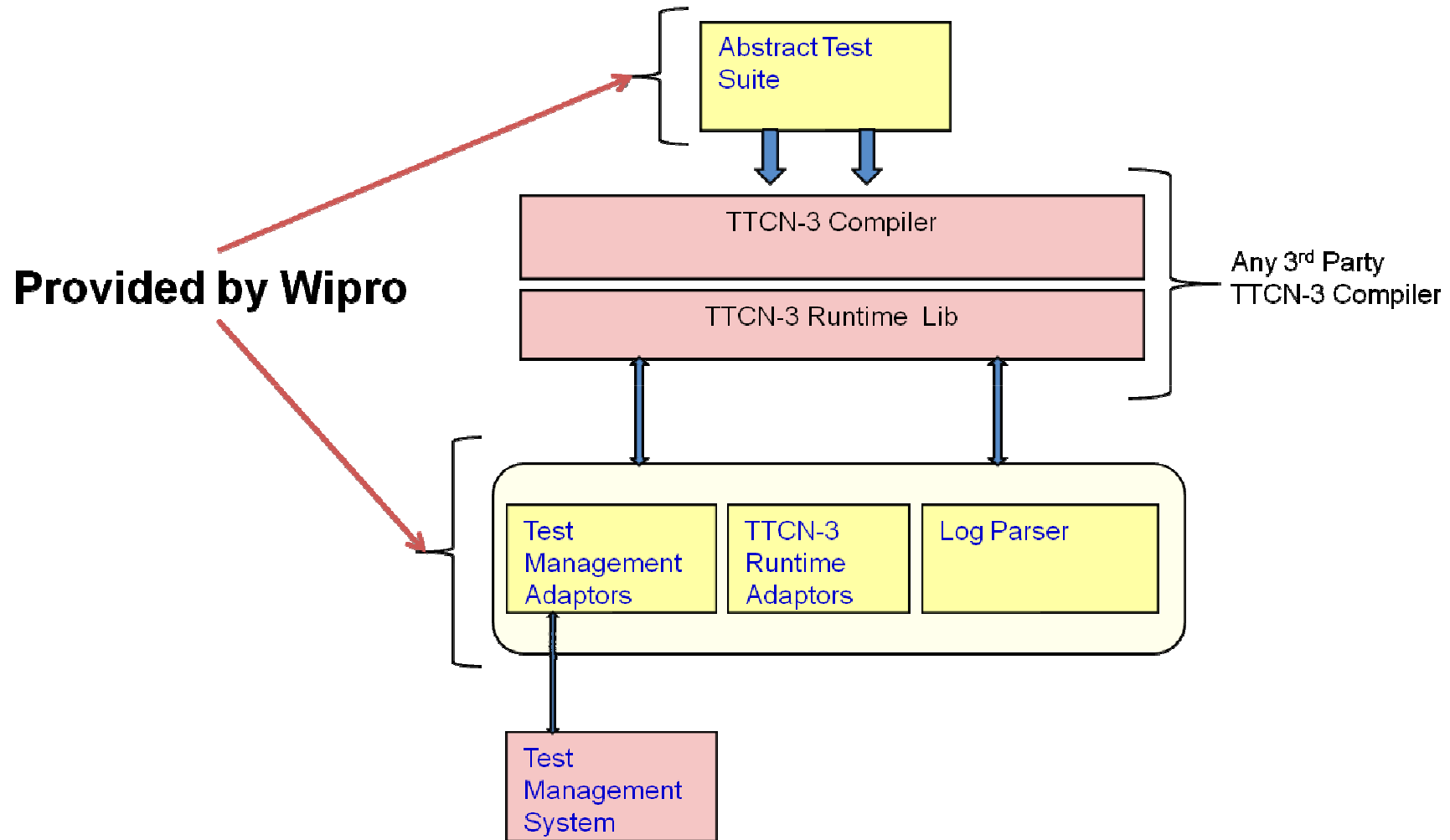


Factor	TTCN3	Python
Skill/Training	High	Low
Coding Effort	Low	Low
Debugging Effort	Low	High
Result Analysis Effort	Low	High
Maintenance Effort	Low	High

TTCN-3 Based Automation Solution



TTCN-3 Based Automation Solution



TTCN-3 Based Automation Solution



TTCN-3 Based Scripting

- Focus on What to Test & not how to test
- De-facto testing language in Telecom and Automotive

Variety of Communication Protocols

- TCP, UDP, Serial communication mechanisms to talk to different systems
- Working on adding SNMP, SSH

Support for Configuration and DUT Management

- Enables configuration and management of DUT without human intervention.
- Reduces test time
- Eases test automation process

Test Management System

- Contains self-sufficient TMS
- Support for integration to 3rd party TMS

Powerful Log parser

- Nullifies human intervention in the test cycle
- Reduces the test cycle & removes human errors
- Eases test automation process

Distributed Test Architecture

- Does not restrict the tester to be co located with the DUT

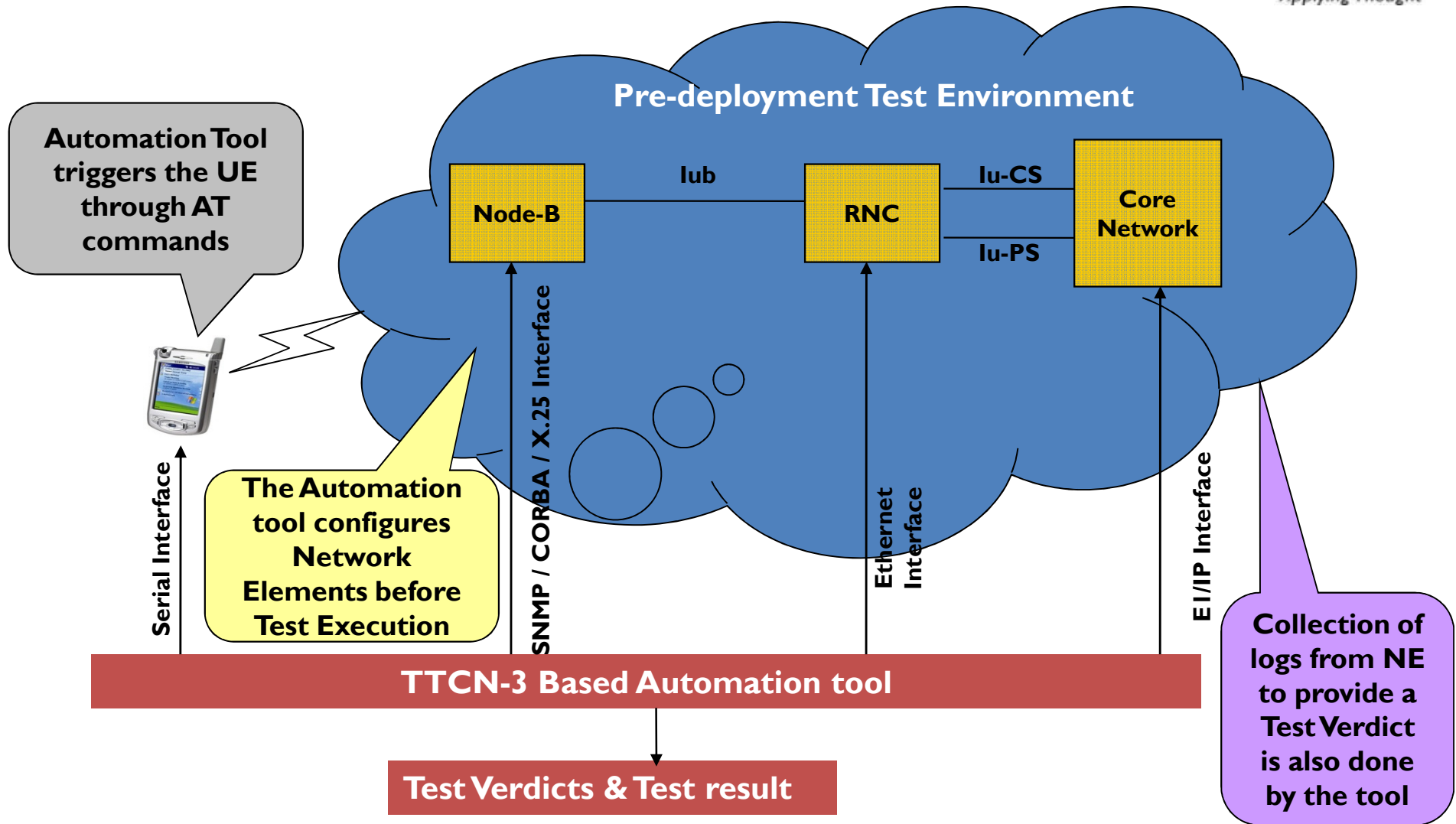
Powerful Logging mechanisms

- Currently HTML & MSC logging is supported
- Easy to digest information
- Message sequencing helps in interpreting the logs easier

Flexible Licensing Models

- Basic or Advanced packaging mechanism depending on the customer needs
- Multiple licensing mechanisms

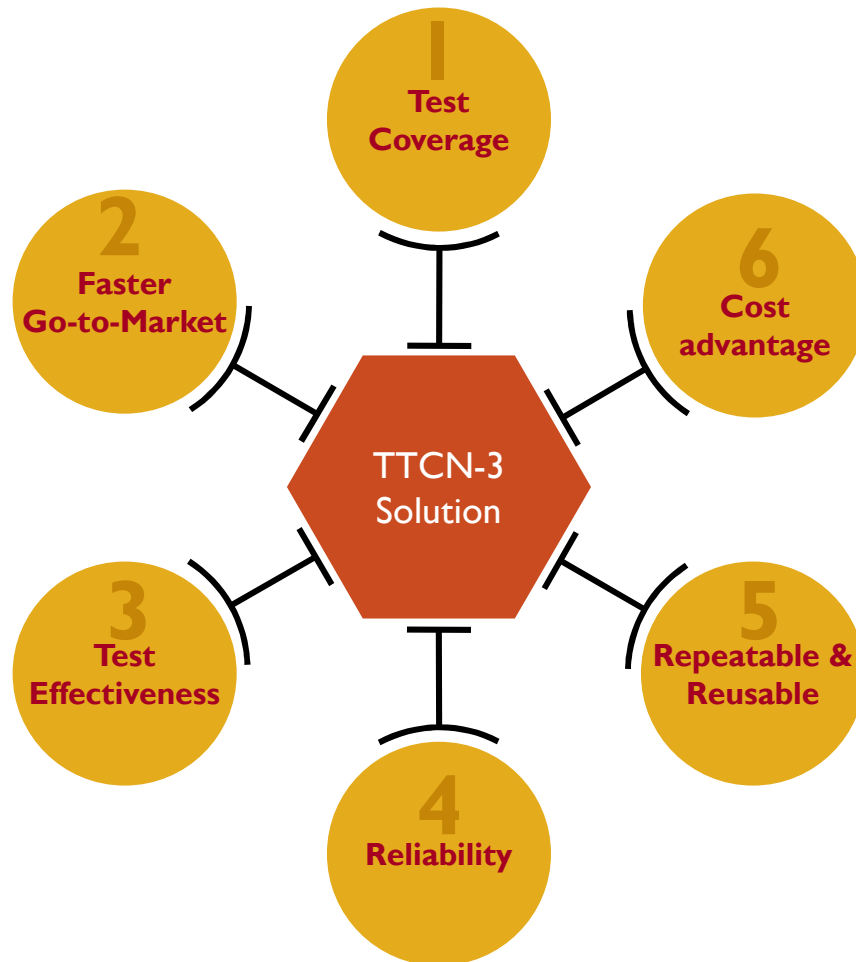
TTCN-3 Based Automation Solution



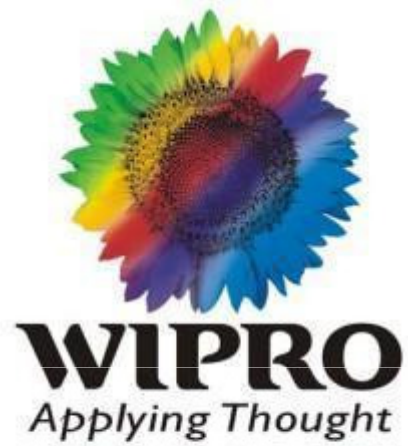


Business Benefits of the Solution

Business Benefits



1	<ul style="list-style-type: none">▪ Increase test coverage & reduce risk
2	<ul style="list-style-type: none">▪ Improve test efficiency and thereby the testing timeframe▪ More testing completed in given timeframe achieving faster-go-to-market
3	<ul style="list-style-type: none">▪ Improve Test Effectiveness by inclusion of complex and varied test scenarios
4	<ul style="list-style-type: none">▪ Reduced human error due to less manual intervention
5	<ul style="list-style-type: none">▪ By introducing programming methods, tests can be made to execute repeatedly, thereby increasing the chances of uncovering errors▪ Test scripts can be re-used, thereby reducing effort to increase automation
6	<ul style="list-style-type: none">▪ Overall savings in cost-of-testing due to process and quality improvements



Thank You

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