



Dependability issues in Ubiquitous Network Services - a Taiwan experience -

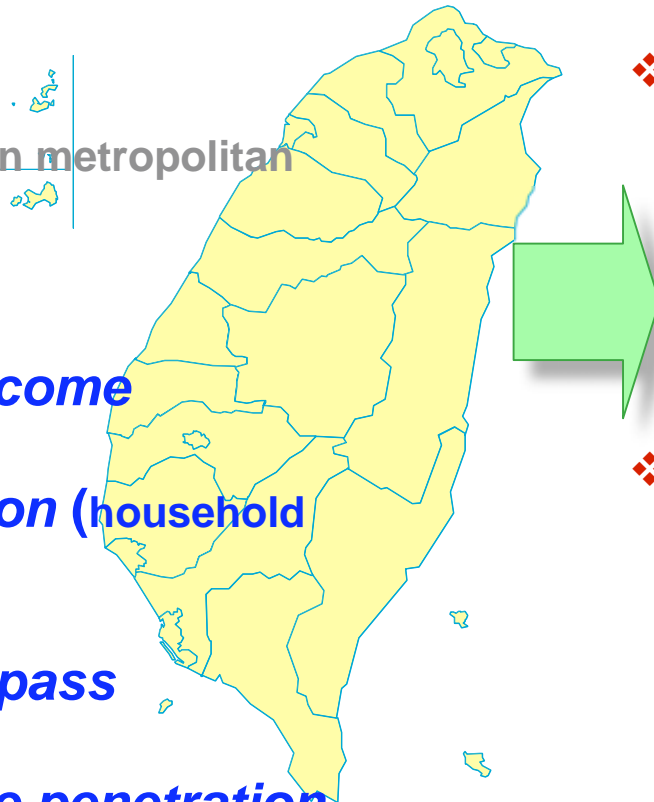
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Some Facts about Taiwan's IT Industries

- **Land Area**
36,188 KM²
- **Population**
22.8 million
(78% resided in metropolitan areas)
- **Household**
7.3 million
- **per capita income**
US\$ 15,676
- **PC penetration (household basis)**
74.3%
- **CATV home pass**
84.8%
- **Mobile phone penetration**
103.82%



- ❖ A major procurement center for global IT companies
- ❖ World Class IT Players
 - Ranked first in market share for > products
 - Dominates IT production in mainland China
- ❖ Largest LCD industry and 3th largest semiconductor industry in the world



Boosting Taiwan IT Industry

- ❖ E-Taiwan Project
 - Broadband wired communication industry
 - PC/Laptop industry
- ❖ M-Taiwan Project
 - Broadband wireless (e.g. WiFi, WiMax) industry
 - Mobile/smart phones/PDA/PND industries
- ❖ U-Taiwan Project
 - WiMax
 - Digital Life & Intelligent Living Environment
 - Remote health/mental care
 - Telmatcis & Intelligent Transport Systems
 - Social Networks
 - IT Enabled Services (ITeS)

III's Mission:





R&D Focus – Ubiquitous Network Services

- ❖ IT Enabled Services
 - Web 2.0, Web 3.0
 - RFID, NFC, micropayment
- ❖ Digital Life/Intelligent Living Environment
 - Device 2.0, Fiber broadband buildings, IPTV
- ❖ Intelligent Transport System/Telematics
 - Intelligent GPS
 - LBS for pedestrians, hikers, bicyclers, etc
- ❖ Broadband wireless communication
 - Multimodal communication (e.g. WiFi, WiMax, LTE) seamless roaming
 - Fast speed vehicle/train/boat



Taiwan's ICT Prospect – Create Digital Life

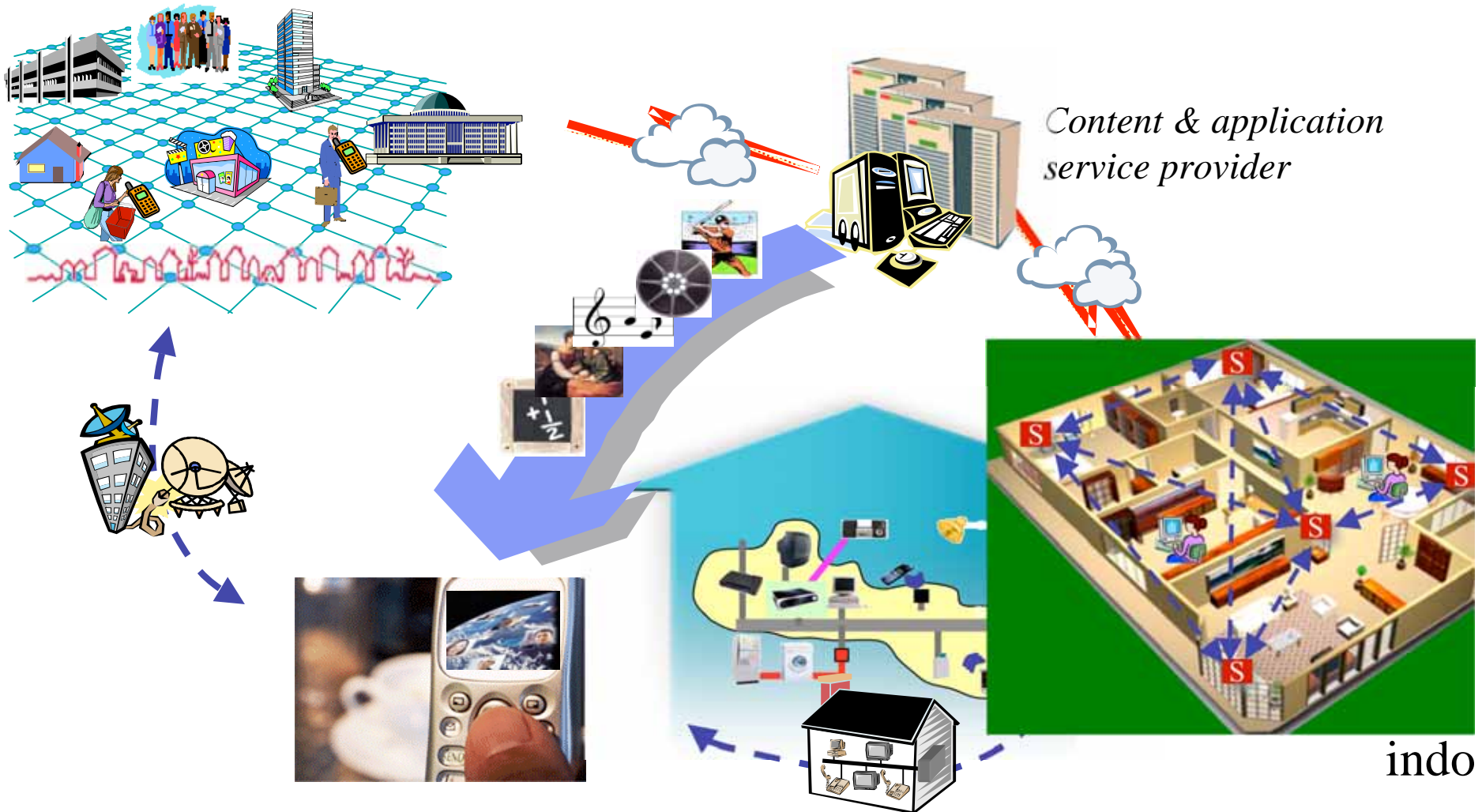
Digital Life





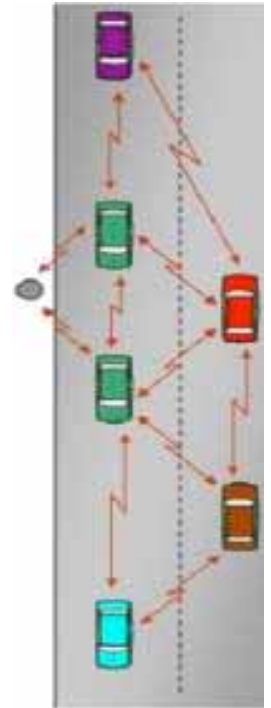
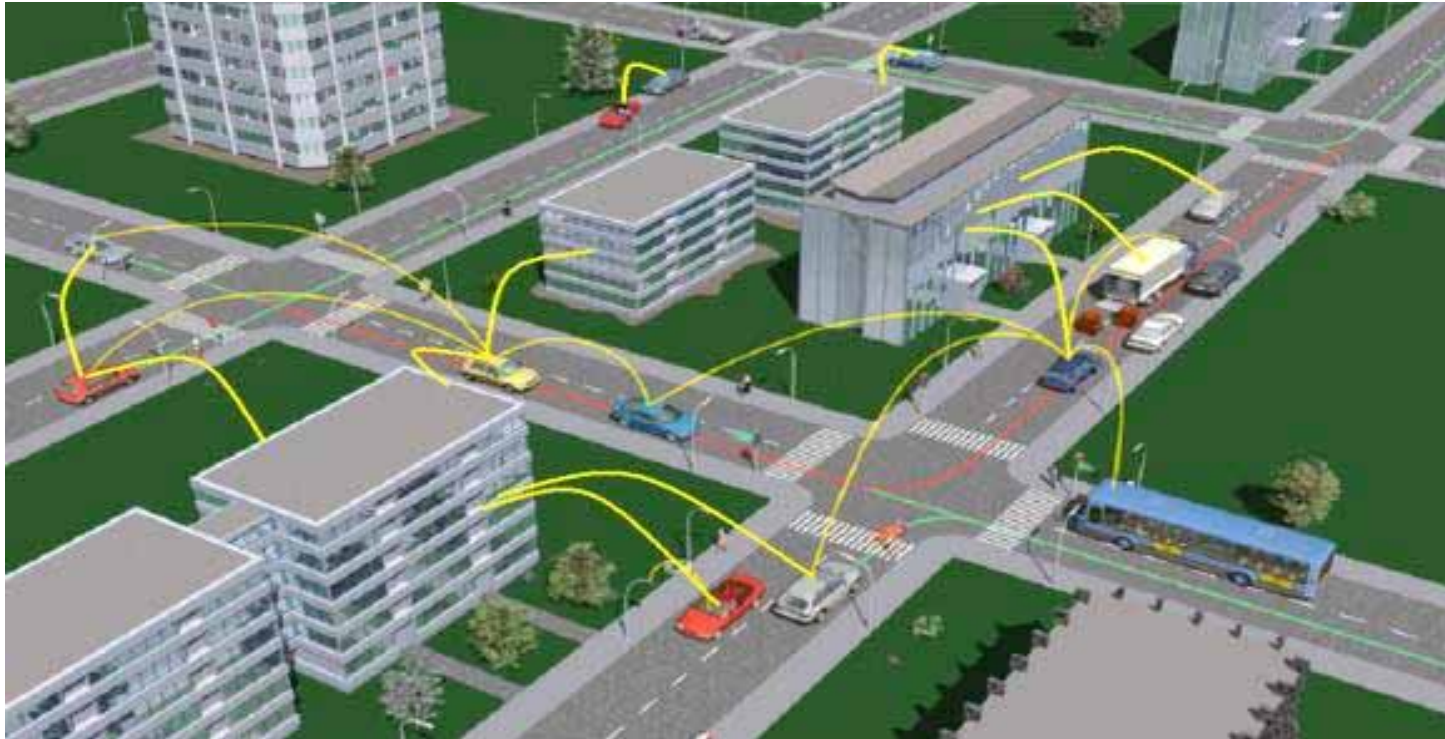
Taiwan's ICT Prospect (Con.)— Establish Intelligent Living Environment

outdoor





Telematics



DSRC – A Multihop Ad Hoc Network

- ❖ **DSRC** is a natural Solution for fast, interactive and reliable communications (V2V & V2I)
 - Ad Hoc vs Infrastructure, V2V at Rural Area
- ❖ Accurate & fast **vehicle positioning** sensing, in part with help from Roadside Infrastructure
- ❖ A Disruptive Technology Makes Paradigm Change Feasible



Dependability Challenges in UNS

- ❖ Client device dependability
 - Using software to extend battery life
 - Recover broken or lost devices
 - Internal security for mobile devices
- ❖ User/device generated contents
 - Trust, security, privacy, availability and selectivity
- ❖ Complexity and diversity
 - Multimodal communications (3G, WiFi, WiMax, LTE)
 - Heterogeneous devices (MID, smart phones, UMPC, PND, e-PC)
- ❖ Mobility
 - Speed (>70 miles/hour)
 - Seamless service roaming (WiFi/3G/WiMax/LTE)



Appendix



Examples

- ❖ Mtube
 - A next generation handheld UMPC
- ❖ Crystal Vulnerability Scanner (CVS)
 - Automatically scan vulnerability of web services

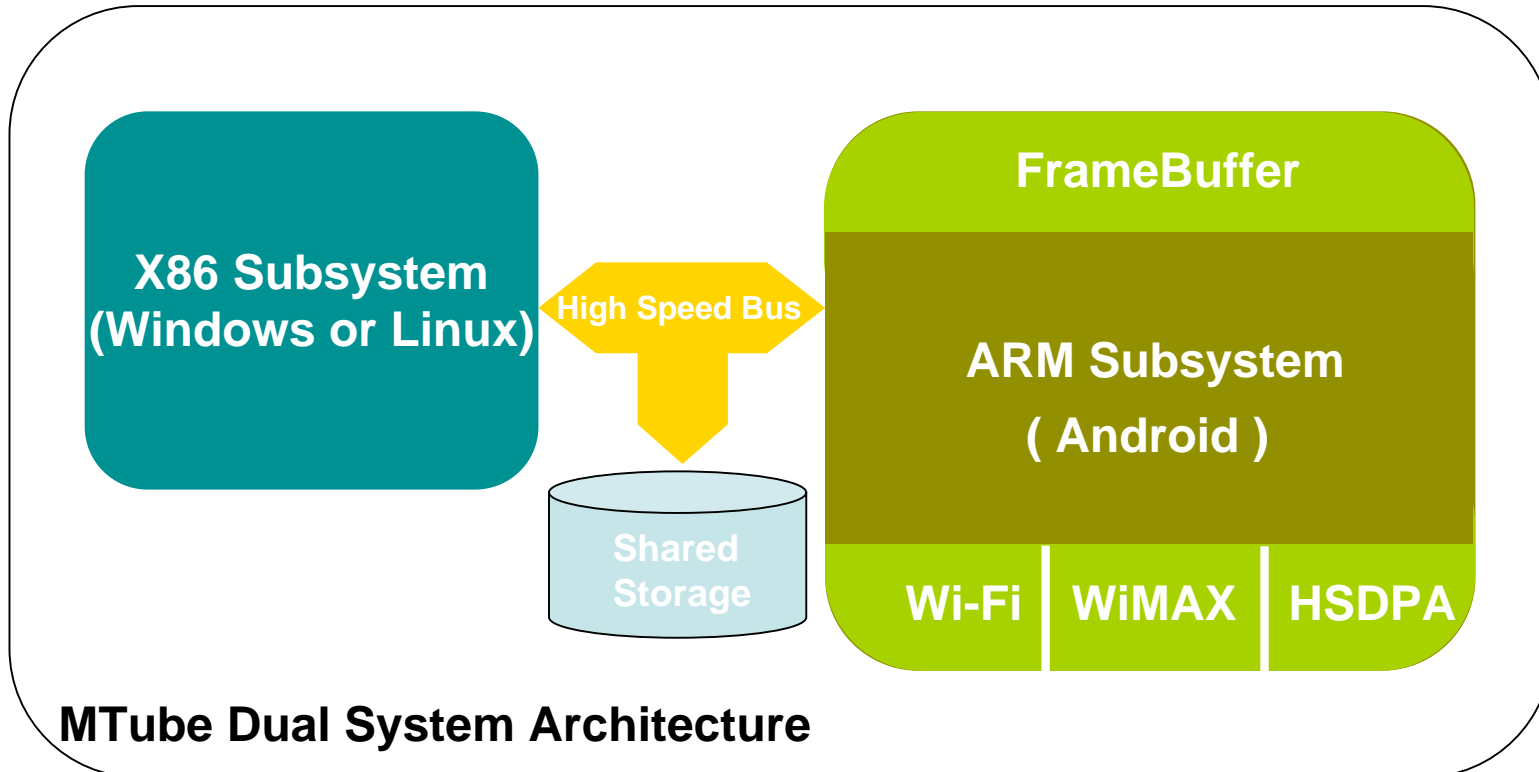


Next-generation Laptop in a Handheld
手持式下世代筆記型電腦

Dependability Research: Extending battery life with software



MTube - Hybrid Architecture





MTube User Interface

❖ Seamless user experience

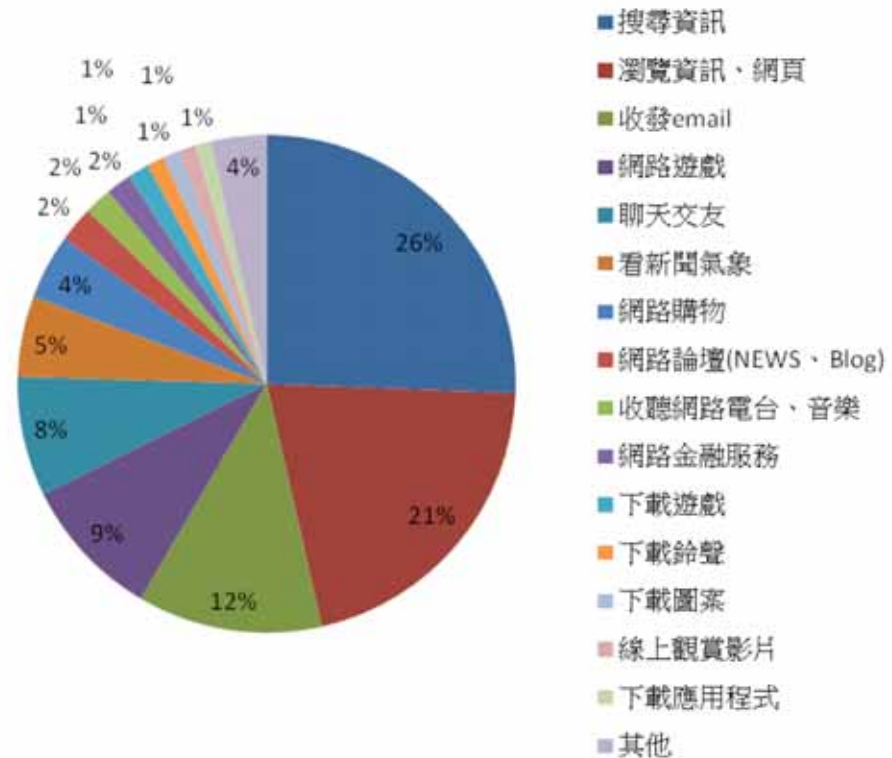


Seamless user experience of dual system



Hybrid Architecture To Reduce Power Consumption

Configuration	Power (W)
ARM + x86+LCD+WiFi	16
ARM+x86 (S)+LCD+WiFi	4.2
ARM+x86 (H)+LCD+WiFi	4
ARM+x86 (S)+WiFi	2.2
ARM+x86 (H)+WiFi	2
ARM+x86 (S)	0.5
ARM+x86 (H)	0.3



Power Profile1 : $(16*0.2+4*0.6+2*0.2)*2+0.3*10=15.33$ wh

Power Profile2 : $(16*0.2+4*0.6+2*0.2)*4+0.3*8=27.2$ wh

Power Profile3 : $(16*0.2+4.2*0.6+2.2*0.2)*4+0.5*8=28.64$ wh

Power Profile4 : $(16*0.2+4.2*0.6+2.2*0.2)*6+0.5*6=40$ wh



CVS Product Positioning

An intelligent network security assessment system which can :

- Perform vulnerability and port scan, along with **automated** penetration test (PT)
- Support distributed scanning and multiple payload testing
- Create exploit profile based on test policy and attack taxonomy
- Generate PT scripting scenario with drag-and-drop interface

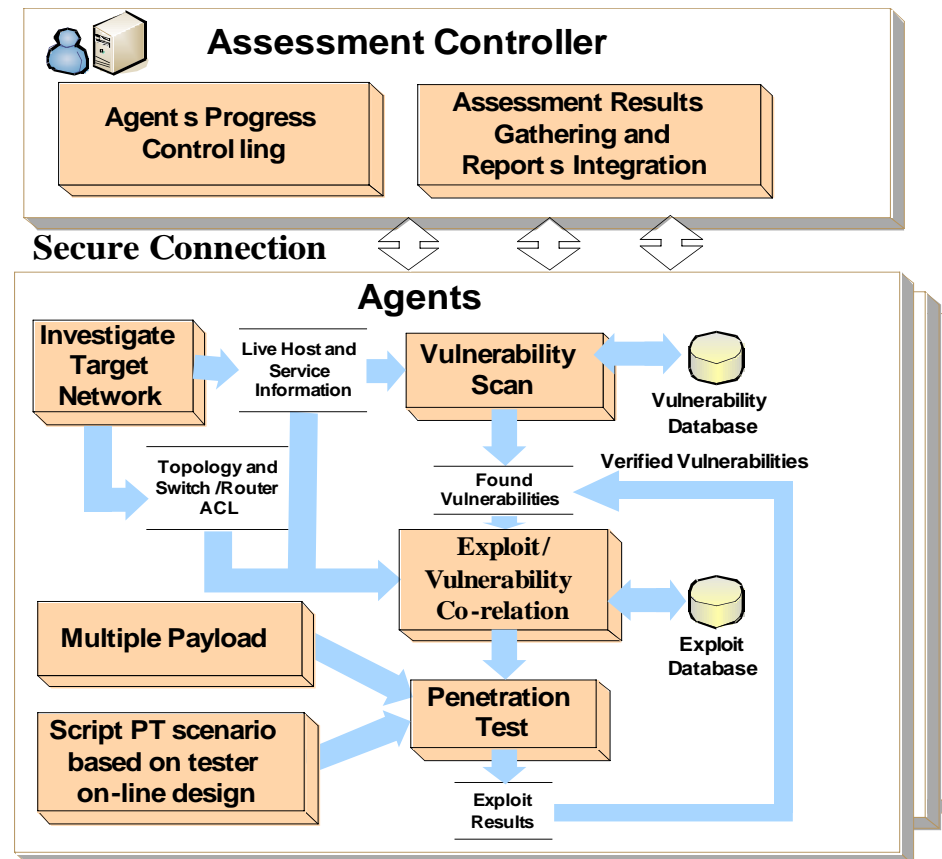
The screenshot displays the CVS software interface. The top menu bar includes 'Agent Management', 'Network Mapping Policy', 'Vulnerability Scan Policy', and 'Penetration Test Policy'. Below the menu, there are buttons for 'Add External Exploit' and 'Update Metasploit'. The main area shows a tree view of exploits under the 'microsoft' category, with 'msmq_deleteobject_ms05_017' selected. Below the tree, there are fields for 'Module name', 'Payload Name', 'Descriptions', 'Target OS', and 'Mapping'. A progress window titled 'Penetration Test in progress...' is overlaid on the right, showing a progress bar at 46% and a 'Cancel Task' button. The progress window also displays 'Agent : 10.50.0.55 Target : 172.16.3.208' and 'Complete exploit/Total exploits: 35/76'.



System Architecture & Major Features

With distributed architecture, the system provide assessment controller to remotely collect the scanning and testing results from agents and generate reports.

- Network configuration auto-analysis
- Policy setting wizard
- Multiple Agents
- Build-in Exploit Database
- User exploit plug-in
- Found Vulnerabilities Verified by PT
- Safe mode of Penetration Test
- Multiple Payload support
- PT Scripting & agent chaining
- Web Component-based Analysis (CBA)
- Pre-defined exploit profiles
- Multi-format Reporting
- Host Group Editor





Multiple Agent & Layer Scanning

