

**Infocomm Development Authority  
of Singapore (IDA), Media  
Development Authority of  
Singapore (MDA)** Microsoft's response to  
Project NIMS – "Industry  
Dialogue on NIMS – Connect  
Requirement, 30 November  
2010"

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## Microsoft's response to Project NIMS – "Industry Dialogue on NIMS – Connect Requirement, 30 November 2010"

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## 1 Introduction

Microsoft would like to thank the IDA and the MDA for conducting this industry dialog process for Project NIMS. We appreciate the continued opportunity to provide our feedback.

Before presenting our responses to individual sections in the consultation document, we would like to first share some general observation in the context of project NIMS.

- **We encourage IDA and MDA to take reference of historical attempts to create horizontal video device marketplace. Past regulatory attempts with similar objectives have generally been unsuccessful.** Examples include the unsuccessful enforcement of the CableCARD regime by the FCC in the US, and the abandoned attempt to mandate DVB-MHP as the middleware technology for interactive digital TV in the European Union. Recognizing the CableCARD regime's failure, the FCC has started to prepare for its sunset and to replace it with a newer regime called "AllVid" video gateway, which in itself may face many technical, operational, and commercial challenges and is still going through the early stages of regulatory due diligence processes.
  - Over the past, there have been many attempts to define standardized interface between a network-centric service (the backend) and the access devices (the frontend) as a means to open up competition and facilitate interoperability among multiple vendors' equipment and ultimately open up a horizontal retail market for the access devices. Some of these standards were enforced through regulations; some were left to market to decide. In either case, historical data has shown that many of these standardized interfaces failed to achieve mainstream adoption and a horizontal retail market did not materialize, especially for those services with significant feature complexity and user-interface sophistication.
  - CableCARD (US): The CableCARD is a Separate Security Module for cable TV services in US, called for by regulation Section 629 of the Telecom Act 1996. While the objective of Section 629 was to spark retail competition for interactive digital set-top-box and cable-ready digital TV sets, the implementation of such regulation was met with significant resistance by the cable industry, resulting in multiple delays in enforcements. Even after the "security integration ban" was enforced by FCC on July 1, 2007, majority of the CableCARD deployment occurred on operator-supplied set-tops, not retail devices. The original objective of creating a horizontal retail market for digital set-tops effectively failed and FCC has openly admitted it in its "National Broadband Plan" (p.35). The CableCARD regime did not work practically since it brought no incremental value to the industry but dramatically increased the costs of the boxes. Majority of the US consumers still opted for the operator-supplied set-top-boxes, instead of buying ones from retail market. As a remedy after 14 years of unsuccessful enforcement, FCC is preparing to let the CableCARD regime sunset and to replace it with a new regime called "AllVid" which proposes an operator-specific set-back or gateway device that exposes a standard set of protocols and interfaces to the consumer electronic devices in the

home network, while allowing the operators to retain proprietary implementation on the network side.

- MHP (Europe): Back in early 2000's, the European Union attempted enforcement of interoperability of interactive TV services by mandating a singular middleware technology platform known as DVB-MHP. Judging from the very limited MHP deployment in Europe to-date, this regulatory mandate approach has generally failed to achieve its objectives. To that effect, the European Broadcast Union (EBU) issued a memo in March 2008 which withdraws its 2001 memo that recommended MHP as the API of choice for interactive digital TV. Although EBU later clarified that MHP remains a viable choice, it is no longer the choice recommended by EBU. With technology and market advancements, both the DVB organization and the EU markets have moved pass MHP to embrace more advanced IP-based interactive TV technologies including both managed IPTV and over-the-top Internet TV.
  
- **Choosing and imposing a single DRM solution is a risky, inherently biased, and undesirable proposition** that will limit consumer choices (in terms of both program sources and devices) and create unnecessary burden to industry participants. **Better and more flexible alternative that allows true multi-DRM interoperability exists today** and is being implemented by major industry consortiums such as DECE via its UltraViolet service and individual service providers such as Netflix.
  - There is an increasing need for NIMS STBs to handle both operator-curated (and protected) contents (a.k.a. IPTV) and Internet-delivered (and protected) contents (a.k.a. OTT online video) from multiple broadband sources. Enforcing a single DRM solution will not only remove operators the freedom to make independent procurement and investment decisions, but also implies that the online video industry also adopt that same single DRM solution, which is unlikely to happen. This will limit the NIMS end-user access to those online contents that protected by other types of DRM technologies.
  - Among the major DRM solutions that are endorsed by premier content owners, there may not be enough differentiation that would dictate operators' preferences. However, the fact is that each industry participant has historically chosen a particular DRM solution to implement. Forcing them to converge onto a single DRM solution would inevitably bring significant incremental costs to each participant in the ecosystem, and such costs could eventually be passed on to consumers, which is not desirable.
  - The industry has worked collaboratively in creating a truly interoperable multi-DRM solution through a container file format called Protected Interoperable File Format (PIFF) that is based on ISO File Format and a common AES 128-bit encryption. Industry consortiums such as DECE and individual service providers such as Netflix has chosen to adopt PIFF in order to support a wide variety of consumer devices and flexible consumption models such as download and streaming. Using a PIFF-based file format, DECE's UltraViolet service will be able to accommodate all main stream DRM solutions (e.g., PlayReady, Adobe Flash Access, Marlin, Widevine, OMA) and has the ability to add other DRM supports in the future when needed.

The key advantage of this approach is that each client device only needs to implement one of these supported DRMs, not all of them, keeping the burden on the devices minimal.

- We propose that NIMS reference DECE/UltraViolet and consider the adoption of PIFF specification which is available royalty-free and will allow operators, STB manufactures, and end-user device makers the flexibility to choose different DRM implementation while allowing end-users to move the same media file across a wide range of devices for multi-screen consumption.

- **We urge IDA to consider the trade-offs between enabling competition in the CE devices market (e.g., for video devices) and enabling efficiency and innovation in the operator networks.** There are potential risks associated with a "standardized gateway device" (e.g., FCC AllVid) or "common featured set-top-box" (e.g., NIMS CFSTB) in that these boxes may limit the pace of innovation and rollout of new services by individual service providers due to the inability of such common-denominator boxes to incorporate timely the new interfaces that are necessary to support the new and innovative services. We urge regulators to consider the much greater degree of technology complexity and user interface elements of an interactive video service than that of telephone devices and services in evaluating the practicality of a horizontal video device market.

## 2 Microsoft Response

- [2.2.3] We support the industry view that DTT support on NIMS CF STB may not be necessary since many consumer devices (particularly digital TV sets) would likely support DVB-T natively going forward. Furthermore, even without native DVB-T support on end-user devices, the DTT contents can still be made available to end-users via ingestion and IP encapsulation at the NIMS head-end and delivery over IPTV infrastructure along with other content sources via the same CF STB without any hardware extension requirements. As such, instead of mandating that the NIMS CF STB be capable of supporting all three dominant **delivery options** (the "**how's**"), we recommend that the NIMS CF STB be required to be able to access and deliver **contents** (the "**what's**") from all three dominant sources, including Free-To-Air contents (DTT), Operator-sourced contents (e.g., IPTV), and Internet-sourced contents (a.k.a., OTT).
- [3.2.1] We agree that having an open access NIMS Platform could potentially lower the entry barrier for RSPs to offer services over the NG NBN by "allowing benefits of the NIMS Platform to be made available to all industry players". However, as it is with all platforms, there will be certain limitations associated with the NIMS Platform, and these limitations will equally apply to all industry players within the NIMS ecosystem. As such, to maximize freedom of innovation and business opportunities over the NG NBN, we would suggest that industry be given the freedom to build alternative video delivery systems over the NG NBN that are not necessarily NIMS-compliant and may in fact compete with NIMS-compliant services in a fair market environment. This would ensure that consumers not only have access to the widest possible range of contents and services, but also the widest possible range of technology innovations and business models that may not be supported in time by the NIMS platform.
- [3.3.1] This section prescribes that the selected operator ("NIMSCo") "**will adopt** a standards-based approach for all critical components of the NIMS Platform and **will select** the IPTV standards to be implemented on the NIMS Platform ("NIMS Standard")." This appears to be somewhat contradictory to section [2.1.1] where it states that "an outcome-based approach as opposed to a standards-based approach was adopted for Project NIMS", as concluded from earlier Industry Dialogues. While it is certainly desirable to apply standards to the NIMS Platform implementation where suitable and with merit, we feel that such prescription runs contradictory to section [2.1.1], [3.1.1], and [4.1.1] where a technology-neutral, non-prescriptive and outcome-based approach was emphasized. We would suggest that the NIMSCo be allowed to choose both standards-based and non-standards-based components based on technical and commercial merits, as long as the desired outcomes are realized.
- [3.4.1] We would like to point out that compared with most of other markets in the world, the local IPTV market in Singapore has a very low, and arguably healthy, degree of fragmentation. In fact, by definition, a healthy degree of "fragmentation" signifies healthy market competition, while a homogeneous market may be alarming sign of possible market monopolization. In most of the competitive markets, consumers *enjoy* and benefit from having the choice of multiple and competing service providers. Having multiple STBs within the home is certainly not desirable, but

in the meantime, it is also not common, even in the most competitive (and more "fragmented") markets (such as France), since service providers do spend a lot of efforts in studying market demographics and design content packages that would satisfy different demographic segments. With the most recent cross-carriage ruling from MDA, consumers in Singapore have a greater assurance of accessing the contents they desire independent of the service provider they choose to subscribe from. As such, one could argue that the risk of Singaporean consumers having to choose between RSPs or having multiple STBs within the home is quite contained.

- [3.4.2] We appreciate the desire to achieve mass adoption of NIMS CF STBs, especially if this is achieved through market competition and consumer choices. However, we would caution against using "financial support from the Government" to "ensure that such devices constitute a significant portion of STBs in the IPTV market." In the EU MHP example referenced in the introduction section, the Italian government initially subsidized sales of MHP set-top-boxes, but found that the market shifted away from MHP to more competitive products as soon as the government subsidies stopped. Being a free market economy, we trust that it is to the best interests of government, industry, and consumers to let the market decide the winner. As the private sectors have invested significant amount in the legacy infrastructures which still power much of the infocomm needs in Singapore, the government should allow healthy competition of interactive multimedia services both within and from outside of the NG NBN and NIMS infrastructure, as IDA duly recognizes in section [7.1]
- [4.2.1] Again, we appreciate the desire to achieve mass adoption of NIMS CF STBs, our opinion is that regulatory options should be the last to be considered unless the market mechanisms fail, which is certainly not the case in Singapore.
- [4.2.2] We believe that recommending technical standards for compliance would go against the earlier conclusion and commitments to the "outcome-based approach". As IDA duly recognized in the earlier consultation document, IPTV standards are still in nascent stage and recommending technical standards at this stage may risk confining Singaporean service providers, manufacturers, and consumers to minority standards.
- [5.1.1] We agree and support the policy objective of enabling end-users to receive the widest possible spectrum of content and service offerings available in the market. Recognizing the reality that a wide spectrum of premium contents exist in encrypted formats protected by a variety of DRM solutions, the NIMS system will need to be able to support multiple DRM technologies, as opposed to selecting any single DRM solution. A single DRM solution, regardless of which DRM is selected, will mean limiting the end-users to only those contents that are encrypted with one particular DRM, and to only those devices that supports one particular DRM. As such, we strongly recommend against resorting to a single DRM solution, but instead advocate for solutions that can accommodate and achieve interoperability among multiple DRMs. Such solution exists, in the form of Protected Interoperable File Format (PIFF), and has been adopted by both industry consortiums such as DECE (UltraViolet) and individual service providers such as Netflix.
- [5.1.2] We agree that it is an increased convenience for consumers to be able to subscribe to multiple RSPs through a single STB. However, due to the inherent limitation of a CF-STB,

consumers may be frustrated by the fact that they are limited to the set of common features in each of the RSP's offer, as they will not be able to enjoy the full set of features and services that RSPs of their interests are able to offer. Foreign RSPs may be reluctant to "dumb down" their value-added differentiating features of their services for the NIMS service area.

- [5.1.3] In any given demographic segment amount the end-users, the wallet-share of TV entertainment expense (i.e., subscription fees) is typically a fixed amount in the family budget. End-users would not likely subscribe to multiple RSPs simply because it is now easier to do so. We would also like to point out that the concern over exclusive content shall be lessened under the new cross-carriage ruling by MDA.
- [6.1.1] we would like to refer back to [2.1.1] and [3.1.1] and suggest that compliance requirements for NIMS CF STBs to be based on feature specifications (which are outcome-oriented) rather than technical standards (which are implementation-oriented). Recommending technical standards for compliance would go against the technology neutral principle that IDA and MDA uphold.
- [6.1.2] This would essentially impose a "must-provide" requirement on both contents and features developed by Nationwide RSPs over the NG NBN. For common features that are prescribed in the CF STB spec, this may be achievable, although this may require repurposing or redevelopment, as acknowledged in [7.2]. However, for enhanced and operator-specific features, they would by definition not be easy or possible to be received by consumers on a baseline CF-STB. We believe that nationwide RSPs offering services over the NG NBN would have inherent incentives in making as much as possible their services to the broadest set of consumers and that regulatory mandate may not be necessary in enforcing such service reach. In the event that regulatory requirements are to be imposed, we would suggest that IDA clarify the scope of the services that would be governed by such "must-provide" clause.
- [7.1.1 & 7.1.2] We appreciate the recognition by IDA and MDA that proprietary STBs or niche subscription TV licensees are exempted from the proposed measure, and so are national RSPs delivering services over legacy (e.g., ADSL or Cable) networks. To reiterate our comments to section [3.2.1], we would further recommend that the industry be given the freedom to build alternative video delivery systems over the NG NBN that are not necessarily NIMS-compliant and may in fact compete with NIMS-compliant services in a fair market environment. For example, national RSPs currently delivering services over legacy networks should be permitted (and encouraged) to migrate its services onto NG NBN as the new transport network without having to change application layers and end-user experiences (including set-top-boxes and user interfaces). This would ensure that consumers not only have access to the widest possible range of contents and services, but also the widest possible range of technology innovations and business models that may not be supported in time by the NIMS platform. It would also maximize utilization of the vast NG NBN bandwidth, as well as maximizing freedom of innovation and business opportunities over the NG NBN.
- [7.2.1] We appreciate the recognition of the need of repurposing and the fact that some of these content and services may not be available on NIMS CF STBs due to limitation on STBs' technical

capabilities. Consequently, the proposed measure would be applicable to a **subset** (as opposed to "the full suite") of existing content, applications and services by nationwide RSPs.

- [7.2.2] While it is appreciated that IDA and MDA may allow exemptions for the "must-provide" requirements, we would like to bring to IDA and MDA's attention the fact that contents and services offerings by an RSP can be very dynamic and fast-changing, due to the real-time sensitiveness inherent to some entertainment contents, and swift dynamics of social trends, and consumer tastes. To apply for exemption on a case-by-case basis may represent a delay in content and service offering that would diminish or even nullify the value of that content/service.
- [7.2.3] We would like to highlight the challenges in coordinating the timing and pace of upgrades to NIMS CF STBs, given there will be a diverse range of CF STBs available in the market, managed by different RSP entities or by the NIMSCo entity. The software upgrade to CF STBs in itself represents another layer of security challenges, i.e., the STBs must have a secure, trusted environment to receive the software upgrades. This requires a trust infrastructure, a certification process, and a licensing regime. In effect, another "protection system" beyond the protection system for the contents themselves.
- [7.3.1] Microsoft agrees and appreciates the focus on achieving the objectives (outcomes) and the flexibility left to the industry to propose the most efficient technical solution.
- [7.3.2] While the specification of the NIMS CF STB is fairly detailed and well understood, the requirements on the video headend/backend system for it to become NIMS-compliant is less clear, and may introduce significant incremental development and deployment efforts for existing National RSPs to become compliant. This may introduce additional delay towards making existing RSP services and contents available to NIMS CF STB users and hence the uptake of the CF STB. We would recommend that IDA factor this potential delay into the deployment plan and volume/timing targets of the CF STB.
- [7.3.3] We appreciate the provision that Nationwide RSPs are not required to procure services from NIMSCo, and would like to further clarify if industry would be given the freedom to build alternative video delivery systems over the NG NBN that are not necessarily NIMS-compliant and may in fact compete with NIMS-compliant services in a fair market environment. If the NIMS Platform is the only platform for delivering interactive video service on top of NG NBN, then innovation and business opportunities may be limited by the capabilities of such platform. We would suggest that the industry be given the freedom and opportunity to innovate both on top the NIMS Platform **and** directly over the NGNBN infrastructure.
- [7.4.1] It is not clear from the consultation document who the party (or parties) that manages the NIMS CF STB would be. If it is one of the RSPs who will be providing and managing the CF STB, it would then raise the issue of how the cost and maintenance of the CF STBs could be attributed appropriately among the RSPs. If it is the NIMSCo who will be providing and managing the CF STB, the business case for a neutral NIMSCo who acts as a wholesaler and do NOT retain billing relationships with individual customers remain unproven. If it is the end-users who will be purchasing the CF STB from retail channels, who would be the primary service provider that would be responsible for the maintenance and troubleshooting of such boxes? Furthermore, when there

is a mixed bag of STB ownerships, it is going to be even more difficult to coordinate a software upgrade to all CF STBs across the market.

- [7.4.2] We agree that a shared usage of CF STB among RSPs could potentially lower the entry barrier (in terms of CapEx for STBs), we would again highlight the potential increase in operational complexity and OpEx required for maintaining, upgrading, and eventually retiring and replacing a large number of CF STBs that may have different ownership structure, different product capabilities, and different life-cycle design. If the STB ownership are tied with one primary RSP, the rest of RSPs are at the mercy of that primary RSP to ensure high availability and reliability of the STBs. Also, each RSP will be reluctant to accept liability if content is stolen because another RSP's security system is compromised, either by accident or by attack.
- [7.5.1] We understand and agree that for those nationwide RSPs who offer services to end-users using their operator-specific (but NIMS-compliant) CF STBs, the RSPs would be able to "present their respective content and service offerings in their entirety, preserving their unique end-user experience." However, for those end-users that are on a baseline CF STB or on other operator-specific CF STBs, by definition, they may NOT be able to receive the entirety of other RSPs contents and services. As such, if the majority of end-users gravitate towards the baseline CF STB, then accordingly, the end-user experience for majority of the market would be limited to the common denominator features prescribed for the baseline CF STB, RSPs would lose the incentive and motivation to innovate and differentiate (since the end-user device would not support). On the other hand, if the majority of end-users gravitate towards operator-specific CF STBs, the market will resemble the way it looks like today, defeating the purpose of NIMS project, particularly given that the MDA cross-carriage rules would have resolved the content exclusivity concerns. In our view, the proposed measure would impose NIMS-compliance requirements on both the front STBs and the headend/backend (per section 7.3.2) and would hence limit the room for RSP competition, resulting in a homogeneous but lowest common-denominator (hence less innovative and less differentiated) market.
- [7.6.1] National RSPs would NOT continue to innovate and introduce new services and applications, if the addressable market has been saturated with either baseline or other operator-specific STBs. Customer acquisition cost would need to include the cost of replacing an existing STB with this RSP's operator-specific STB. Again, the market behavior would return to the state that we are in today, where replacement of STBs are required in order to receive a service provider's services in their entirety.

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