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Working Party No. 9
Sub-group on Electronic Commerce

REPORT FROM THE CO-CHAIRS OF THE TECHNOLOGY TAG TECHNICAL ADVISORY GROUP (TAG)

Executive Summary of the Technology TAG's Work to Date

The attached document is submitted FOR INFORMATION under Item IV of the Draft Agenda of the Fourth Meeting of the Working Party No. 9 on Consumption Taxes, to be held on 30 November - 1 December 2000.

This document is a final working draft of an executive summary of the work of the Technology Technical Advisory Group (TAG). Subject to a final review by TAG members and the addition of the various annexes, this will then form the Report by the Co-chairs of the TAG.

Please note then that this is not yet a final text - nor are the annexes yet available. In view of the meeting of the Working Party No. 9 on Consumption Taxes this week, the Co-chairs of the TAG concluded that it would be better to let Delegates see this version of the executive summary - so that you have some additional material on the Technology TAG's advice and input into the debate. (Some of the annexes may be available by the time of the meeting, and so may be distributed as room documents.)

As with the companion Report from the Co-Chairs of the Consumption Tax TAG, before any publication of the full report, there will also be some editorial work needed to ensure that cross-references to other documents are

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NOTE BY THE SECRETARIAT

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REPORT FROM THE CO-CHAIRS OF THE TECHNOLOGY TAG

EXECUTIVE SUMMARY OF THE TECHNOLOGY TAG'S WORK TO DATE

Introduction

1. The Technology TAG has undertaken a range of work with the Consumption Tax and Professional Data Assessment (PDA) TAGs and the Working Party No. 9 Sub-Group on Electronic Commerce ("WP9 Sub-group") in examining the technological implications of the various collection models considered for collecting consumption taxes on cross-border electronic commerce transactions and the reliability of indicators systems and trails for audit purposes. This work is brought together in this report to summarise the Technology TAG's conclusions at this point in time. Where appropriate, each section sets forth suggestions of where continued work is required. As a further mandate, the TAG looks to continuing work in resolving the extant issues presented by the various technologies, most of which are quickly evolving as is all the technology underlying electronic commerce.

2. Annexes to this paper are sourced mainly from the 22 May 2000 Collection Models v.1 paper. These attachments have been edited to reflect new understandings and work of the TAG. While providing less detail than the original paper, it is hoped that this format makes the work more accessible. Other annexes reflect work undertaken to respond to inquiries from the PDA TAG or from questions raised in discourse with the WP9 Sub-group or the Consumption Tax TAG.

Scope

3. The mandate of the Technology TAG has developed into that of a responsive expert group providing contextual information regarding the applicability of technological solutions to issues of audit, tracking and collection. Beyond applicability, the Technology TAG also provided estimates of reliability and evaluated solutions based on the practicability of implementation. Implementation issues included factors such as cost, efficacy and commercial reasonableness.

4. Generally speaking the tax collection issues which we were asked to address implicitly contain four fundamental assumptions:

- First, the electronic transaction type which is the most susceptible to tax avoidance and requires a tax collection solution is that of "virtual products[1]" sold from businesses to consumers.
- Second, the primary means by which consumers will access the Internet for the purchase of "virtual products" will be via computers or interactive TVs and, over time, through mobile devices[2] but most virtual products are not suited to download by current mobile phones.[3]

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1. Virtual products as used in this paper includes all goods or services which are or can be provided completely over electronic media. This term covers goods and services which may not be subject to tax or which may be the subject of disagreement or inconsistent national and sub-national classification. It is not the intent of this paper to address those issues.

2. Less than a computer but more than a phone. Most will have touch screens and small hard drives in a form factor along the lines of today's larger Personal Data Assistants (Palm, Psion, Pocket PCs).

3. Any solution proposed for collection of consumption taxes must however be flexible enough to deal with mobile access. While virtual products are not downloadable to mobile phones a variety of virtual services are already

- Third, although this paper deals primarily with VAT and similar consumption taxes, any system which is designed must necessarily take into consideration alternative systems such as the Sales / Use tax system in the United States.
- Lastly, the dominant issue for consumption taxes is cross-border transactions.[4]

Collection model options

5. While the paper considers the four primary models that have been advanced for the collection of consumption taxes on cross-border e-commerce transactions, we would stress that we don't see these models as mutually exclusive from a technological perspective. It is important to ensure that any first steps towards implementation of a collection model is consistent with the development of a longer term solution. This is a necessary step to minimise business compliance costs as well as the ease of administration by revenue authorities.

6. We also advocate the implementation of the ultimately agreed model on a smaller scale such as the sale of virtual products from businesses to consumers as a viable short term starting point. Clear signals from government in relation to the preferred long-term solution would also facilitate businesses working with government without the distraction of dealing with short-term proposals.

7. We also highlight the fact that end-to-end virtual transactions are currently a very small part of e-commerce and a fractional non factor in commerce overall. We deal primarily with these issues in this paper because of the context of the questions put to us. We also recognise the potential for significant growth in this area and that the complexity of the inherent issues coupled with the pace of technological innovation and maturing of business models will require more intense study to develop appropriate solutions in advance of significant growth in this area.

Relevant technologies

8. Successfully implementing a viable consumption tax collection model will require harnessing of the same technologies that businesses are adopting for their electronic commerce initiatives. Inherent in this is the need to link collection mechanisms with the underlying business models to maximise the return on the necessary investment for both business and government.

Shared technological elements

9. Before examining the collection models that have been proposed for our review by the WP9 Sub-group, there are a number of shared technological elements common to many of the tax collection/administration models which the Technology TAG has investigated. From a technological perspective, we have found it useful to consider the models from the perspective of the broad activities or modules represented in Figure 1.

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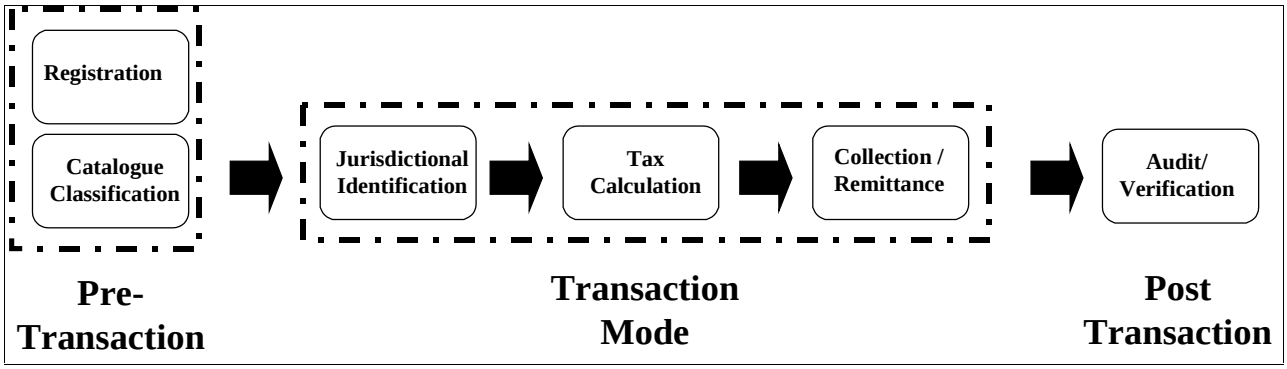
available through wireless portals. Massive growth in the numbers of wireless device users accessing the Internet over the next few years is being forecast by most observers (for example, see IDC.com).

4. With an understanding that certain jurisdictions such as the United States have complex sub-national sales and use tax systems which pose similar issues.

Figure 1. Shared technological elements



10. The primary differences between the proposed collection models are then limited to how this logical model would be physically implemented (for example, who would have responsibilities for different activities).

Jurisdictional verification

11. The module which has presented the greatest challenges for the Technology TAG is the jurisdictional identification module. Common to all models, the challenge is to provide merchants with a mechanism which, *inter alia*, allows the jurisdiction of their consumer to be verified. *This information is essential if the Ottawa framework condition that taxation should be in the jurisdiction of the consumer is to be enacted.*

12. Annex G provides a "Technology Primer for Identity of Parties and Classification" which discusses the potential technologies and their strengths / limitations. The primary findings of the Technology TAG in relation to the identification of a consumer's jurisdiction are:

a) The simplest form of jurisdictional identification is to accept a **consumer self-declaration** of their jurisdiction. The financial incentive for a consumer to incorrectly declare their jurisdiction in order to avoid consumption taxes means that this solution, while technologically simple to implement, has major limitations from a government perspective, giving rise to increased scope for revenue risk. Some form of verification of the consumer's self-declaration will be necessary if a degree of reliability acceptable to revenue authorities is to be obtained.

b) In conjunction with **payment system providers**, an examination was undertaken of the potential for using credit card numbers, credit card billing addresses or other information inherent to credit cards to verify a consumer's jurisdiction. Annex X details the results of this examination. While we are continuing the dialogue with the credit card companies, the Technology TAG's conclusion is that the credit card business processes do not provide a workable verification methodology. In addition, the directions of the payment system providers' business models mean that the current verification limitations will only become greater over time. It is therefore unlikely that revenue authorities' jurisdictional verification needs will be met through these avenues unless a (currently non-apparent) strong business rationale can be identified to provide a suitable return for the payment system providers.

c) Internet Protocol (IP) addresses offer potential in that they are an essential part of every access point to the Internet. **IP traces** have some limitations (such as single worldwide access points for AOL users and corporate aggregators, use of anonymisers, plans for IPv4 to be replaced with

IPv6[5] and potential for spoofing) such that the costs of implementation may not be worthwhile.[6] Given today's technology, the limited improvement in location technology offered by IP traces appears to be the best available, but there is a significant reluctance on the part of business to undertake implementation of such systems because of concerns of the lack of commercial necessity, limited utility, almost assured obsolescence of IPv4 traceware in the near to medium term, costs of implementation and potential for disruption of service in cases of unclear results. Lastly, while inquiries have uncovered that IPv6 does not currently include a predictable geographic component, further work needs to be done to better understand the potential for jurisdictional identification. IPv6 tracing technology will need to be monitored as it develops. Governments need to be aware that the pseudo-geographic link between IP number and jurisdiction can potentially be significantly strengthened. However this will become harder and costlier to accomplish once full, rather than trial, deployment of IPv6 begins. Research on this must be a priority as IPv6 deployment is expected within the next two years.

d) Technology-based options utilising **digital certificates**, alone or in conjunction with trusted third parties, could offer genuine potential in the medium to long term. This requires an uptake by consumers and a change in existing business-to-consumer models. However commercial deployments are now underway and businesses are beginning to invest in consumer solutions. More detailed examination of this potential, and how best governments might support and utilise it, is an important field of further work.

e) The Technology TAG understand and agree on the need to find a practical short term solution to meet the needs of government without negatively impacting the ability of business to engage in online commerce or imposing unreasonable burdens of compliance. It is possible that **viable short-term solutions** may not be technological solutions (*e.g.* the use of a merchant's internal databases). Progressing viable short-term solutions should be one of the first items of work for the Technology TAG once it reconvenes.

f) Any solution must also encompass the increasing consumer sensitivity and industry responsiveness to concerns about **privacy and data protection**. Many commercial systems are being designed on a more need to know and permission marketing based information architecture. There is thus a significant reluctance on the part of business to collect more information than that needed for commercial purposes. This trend is also impacting the future developments in payment systems.

13. We suggest that the whole area of jurisdictional verification needs further work. To be done properly, this work may eventually require a dedicated team of experts. We stress the need to complete further basic research before settling on any collection model or method that requires technological deployment. The policy and practice are symbiotic and need to be developed concurrently. Resolving policy independently of understanding the required technology may lead to policy that can't be practically implemented.

14. These limitations also lead the Technology TAG to caution re moves away from place of consumption as the principle for imposing consumption taxes on digital products. Moves by the WP9 Sub-group towards using place of residence as the basis for taxation may limit the options for technological verification in the future. With the major exception of digital certificates, technology may be as or more likely to be able to determine a consumer's location (*i.e.* place of consumption) in the longer term rather than their place of

5. Internet Protocol numbers are the Internet equivalent of a phone number or address. The current protocol is Internet Protocol Version 4 (IPv4) which defines an Internet address a unique number consisting of 4 parts separated by dots, *e.g.* 165.113.245.2

6. The experience of US-based cryptography exporters in using IP numbers to verify purchasers' country in order to meet Bureau of Export Exchange requirements is of an estimated 60 to 70% matching of IP address with the self-declaration was achieved. Note that a mismatch was not the only check as companies also checked against a denied parties' access list which increased the reliability for the agencies involved.

residence. We therefore advocate that flexibility should remain in the longer term defining of "place of consumption".

The collection models

15. The Technology TAG's conclusions in relation to each of the four primary consumption tax collection models identified in further detail in annex 3 are set out below. As discussed above, we examined the collection model from the perspective of a logical model detailing the broad activities or modules required for a successful implementation. We have also commented below on the 'Simplified Interim Approach' advocated by the Consumption Tax TAG in their letter of 17 November 2000.

16. While a version of the Tax at Source and Transfer / Trusted Third Party models[7] is the Technology TAG's favoured model of those initially considered, we would advocate that future discussions concentrate on determining how each of the above six modules could best be implemented to achieve the goal of a successful consumption tax collection model. The most efficient and effective long term solution must successfully address all six of these elements.

The self-assessment option

17. Self-assessment is seen as a viable option for business-to-business transactions. No technology issues have been identified.

18. While there is little cost to a pure self assessment deployment (additional inquiry field in web pages) there are significant government concerns in relation to the reliability of the resultant data. The technology costs and the low likelihood of a successful commercial deployment or a reliable verification system result in a recommendation that this option is the least practicable for business-to-consumer transactions from a technology perspective. The view of the Technology TAG is that a Self-Assessment model that government agencies would find reliable creates almost insurmountable problems to implement from a technology standpoint. Limitations in current registration options, identity verification issues and difficulties in verifying many small payments from many sources combine to make a model which can not be robustly implemented with the currently available technology.

The registration option

19. The major technology issues posed by this model are the identification of the consumption tax status of the customer; verifying the jurisdiction of the consumer, identifying non-resident suppliers and developing systems capable of compliance once those factors are established.[8]

20. Technology appears to be capable of providing solutions to the first two issues in the medium term. The resolution of these issues is also required for the collection models discusses below. While solutions are advanced for the identification of non-resident suppliers, it is unlikely that the taxation net will ever be completely robust.

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7. It should be noted that all Tax at Source & Transfer; the Trusted Third Party and the Hybrid models discussed in this paper have the same underlying logical model. The differences stem from how the model is implemented and responsibilities for the various functions are shared / split between the business, trusted third parties and revenue authorities involved in the tax calculation and collection process.

8. Note that this analysis presumes a perfect world where no policy issues exist as to which jurisdiction's rules should be used for remittance and calculation or which classification is appropriate.

21. The Technology TAG sees the imposition of significant compliance costs on non-resident suppliers, especially those making supplies in multiple jurisdictions or making nominal supplies, as an important drawback of this model. The provision of easily accessible information on the Web or an enhanced system to provide a goods classification and calculation routine on the Web is advanced as a possible technological solution to improve the implementation of this model. These solutions are also important components of the following collection models. In looking at simplification of compliance and sharing of burdens suggestions were made relating to globalising applications, simplifying rates and calculation and having burdens of compliance equitably shared where appropriate.[9]

The tax at source and transfer option

22. Current technology would enable an implementation of the tax at source and transfer model. In fact commercial providers already offer products which between them exhibit all the characteristics of the model. The major technological limitation at this point in time is around verifying consumers' jurisdiction as discussed above. The model is also flexible enough to benefit from future improvements in technology and the adoption of new technologies by business and consumers.

23. The main work required to implement this model is in attaining government agreement for the collection, transfer and remittance of consumption tax revenues. Technologies should also be considered that could mitigate possible increases in costs of tax administration.

The trusted third party / clearinghouse option

24. From a Technology TAG viewpoint, the TTP model is in large part identical to the tax at source and transfer model. The difference is that a trusted third party is charged with responsibility of collecting the tax rather than the local revenue authority.

25. The model raises the issues of achieving efficiency in implementation and examining how the costs / benefits of a consumption tax model could be shared between the parties involved in either the transaction or the collection of the resultant taxation revenue.

Combining the tax at source and transfer / trusted third party models

26. The strengths and weaknesses of these two models in some ways counteract each other. An alternate approach may be a hybrid one that takes parts of both the tax at source and transfer and the clearinghouse models. Such a hybrid approach is attractive from a technology perspective.

The Consumption Tax TAG's simplified interim approach

27. The Simplified Interim Approach (SIA) advocated by the Consumption Tax TAG provides a number of suggestions which would overcome many of the current issues associated with collecting consumption taxes on cross-border transactions. From the Technology TAG's perspective, SIA provides an integrated non-technological solution to the current consumption tax challenges. We have a great degree of empathy with the issues raised and advise that there is no technological impediment to this interim solution. We do, however,

9. There is a recognition that a global tax system is impossible in the short term and improbable in the mid term, but global approaches to forms and methods coupled with government's assuming responsibilities for simplification to the extent possible and maintaining current, online accessible tables of tax could ease some of the compliance burden on business.

suggest that all possible efforts at simplification be undertaken and that a uniform user interface and forms set be developed to help facilitate implementation/use and to lower compliance burdens. Lastly, consideration of government maintained online tax tables, which are uniform in format, might also help facilitate the development of online look up systems for real-time tax calculation in cross-border transactions. More specific comments are set forth in the conclusions below.

Collection model conclusions

28. The Technology TAG sees the self-assessment model as impractical for business to consumer transactions.

29. The remaining proposals have strengths in particular elements but also have inherent weaknesses. For example, the registration model is strong in minimising government administration costs but business is left with a large burden in being able to correctly identify the consumer's jurisdiction to correctly levy a consumption tax. The costs involved in potentially registering and complying with up to 120 jurisdictions' tax systems are also abhorrent to businesses facing this prospect. The registration model is seen as a damper on the growth of e-business. This weakness from a business perspective is a strength of the tax and transfer model.

30. This leads to the concept of examining elements of the collection models to result in a stronger model. Such an analysis would involve determination of the technological alternatives for successfully implementing each of the six broad activities or modules shown in the model above.

31. To the extent that the Consumption Tax TAG and WP9 Sub-group have recommended to examine Registration Models as a near term solution, we would emphasise the following factors that may minimise compliance burdens:

- Develop standardised global procedures (forms, registration methods...) and web access.
- Engage in simplification to the greatest extent possible.
- Explore ways to share compliance burdens, including by developing hybrid approaches.
- Understand the current limitations of technology to provide identification and verification.
- Work with business to explore technological improvements in identification and verification that have independent commercial utility to assure business investment and deployment; and
- Ensure that any interim registration options lead towards a more palatable collection model for the medium term.

Issues related to Professional Data Assessment

32. Many issues which were considered for the PDA TAG revolved around the issues of verifying the location of the identity of parties to the transaction, where the parties were, when the transaction took place and the information inherent to or contained within the transaction. Since the PDA TAG looks at these transactions after the fact major issues were also raised as to the reliability of the records and systems which established the who, what, when and where of the transaction. While end-to-end virtual transactions were recognised to be the most problematic, concerns were raised about verifying electronic records of transactions. Since, under this section we will only discuss those issues which are significantly different than those raised in our evaluation of the collection models, the focus will be on when a transaction occurred and the reliability of records of the transaction. By way of analysis context, we point out that when reviewing the above factors, we also looked at

issues of commercial reasonableness, costs of implementation and retention and comparison to non-virtual equivalents.

33. The PDA TAG highlighted two ways in which factors could be established. The first was to show that the record itself was worthy of credibility and contained sufficient information to establish the information in question. The second was to establish that systems, accounting methods and audit procedures were in place that were sufficient to provide evidence in the credibility of these systems. It was recognised that the latter case would be more applicable to larger businesses who hired or had on staff professional accounting experts who had reviewed systems and practices. In light of the greater concern with the smaller, unaudited practitioners, most of our attention was focused on those cases.

Establishing when a transaction occurs

34. The PDA TAG stated, in relation to consumption taxes, that it was necessary to establish the day when a transaction occurred. The two major technologies reviewed to establish transaction time were third party time stamping and document storage service providers and time stamp technologies (third party or system clock) included in e-commerce systems. While revenue auditors showed a preference for third party service providers that would both time stamp and archive documents, it was acknowledged that there was no reasonable commercial purpose for such service and the costs were prohibitive for the vast majority of online transactions.

35. Electronic commerce systems integrate order entries into databases. Databases provide relative[10] data entries keyed off the system clock. These systems can also be supplemented by references to external time stamping services. There were likewise, however, no commercial reasons for such services for the vast majority of Internet consumer transactions and there were concerns from revenue auditors that systems clocks and electronic records may be subject to alteration. In light of the presumed lack of programming sophistication by most SMEs it was considered that the greatest risk to alteration arose where third parties created programs designed to hide transactions or otherwise interfere with the proper functioning of the back end e-commerce systems.

36. Annex S discusses the technology aspects of electronic record integrity in more detail.

Need for training

37. There were concerns that there might be unreasonable expectations as to the ability of e-commerce systems to improve on the reliability of current paper-based and computerised accounting systems. These expectations resulted from the lack of training on e-commerce systems for auditors coupled with the lack of system models to compare. In a paper-based system, fraud is mostly discovered not by forensic analysis, but either by visible proof of changes or lack of congruity to established expectations derived from reviews of similarly situated businesses. In the case of electronic systems and transactions there is a need for auditors to understand the electronic traces which are left on systems as well as comparative models for Internet-based businesses.

38. Lastly, in tandem with work related to digital signatures, technologies for authentication and verification should be explored in relation to document reliability.

10. "Relative" refers to the fact that data base entries are logged in relation to each other for the purposes of reconstruction of the database.

Proposed future work

39. Members of the Technology TAG have had some discussions around where the TAG's work should progress in the future. We believe that there are a number of factors which should underlie future work in this area:

- There is little tax revenue at stake currently in end to end online downloads.
- Technology, as existing and commercially diffused today, does not provide robust identification or verification methods for such downloads, however promising technologies were likely to be deployed in the middle term.
- There is a need to keep working on these issues as a priority in order to assure a level playing field for all market participants in cross-border transactions and the ability to collect revenue when such trade becomes more substantial.
- The emphasis needs to be on identifying solutions that could be deployed for effective compliance and we strongly caution against solutions that are incapable of compliance verification, overly burdensome in terms of cost or complexity or not supported by independent commercial rationales for collection of information.

40. This background and our experiences to date led us to identifying the following areas as offering potential and warranting further examination:

- Examine viable short-term solutions which may not be technological solutions (*e.g.* the use of a merchant's internal databases).
- Further study of global IPv6 numbering including examination of the potential for geographic links to be inherent to IPv6 numbers.
- Complete a catalogue of third party tax services providers to document what is currently available and to provide information to merchants.
- Further study of digital signatures and what models may make sense for use by revenue authorities.
- Issues related to use and recognition of digital signatures in cross-border situations; roles of government and private sector in providing certification / registration authority services.
- More detailed review of the impact of wireless technologies and the impact of greater bandwidth availability.
- Ongoing monitoring to ensure that OECD directions correlate with changes in technology and commercial business models; and
- To identify new technology that could be harnessed to help address the taxation challenges of electronic commerce.