

For discussion
on 13 April 2010

Legislative Council Panel on Security

**Enhancement of Information Technology Infrastructure for the
Hong Kong Police Force**

PURPOSE

This paper consults Members on the proposals to enhance the information technology (IT) infrastructure for the Hong Kong Police Force (HKPF) by development of the Second Generation of Communal Information System (CIS2) and initial employment of virtualisation technology.

**DEVELOPMENT OF THE SECOND GENERATION OF
COMMUNAL INFORMATION SYSTEM**

Background

2. On 29 January 1993 and 19 July 1996, the Finance Committee approved a commitment of \$299.370 million (later revised to \$289.770 million) and an increase in commitment of \$66.000 million respectively for the implementation of the IT Strategy of HKPF. Under this strategy, the Communal Information System (CIS) was launched in 1997 to replace the manual Miscellaneous Report Book in individual Report Rooms with a non-recurrent expenditure of \$146.410 million. On 10 May 2002, the Finance Committee approved a commitment of \$17.440 million for HKPF to upgrade CIS and expand its capacity to cope with the growing operational need.

3. The CIS supports HKPF's day-to-day operations. It captures, maintains and processes details of cases reported, assists in prosecution, generates management reports for crime prevention, and supports traffic operations. The CIS also serves as a major feeder system to other HKPF's

systems¹ for crime intelligence and road safety purposes. In addition, it provides information exchanges with the systems of other departments, like Case and Summons Management System for Magistracies of the Judiciary. However, most of the information exchanges between the CIS and other internal and external systems are conducted manually.

4. At present, there are around 20 000 CIS users comprising disciplined and civilian staff in all police stations and formations. Information reported by members of the public or processed by the police officers is entered into CIS in the form of a police case. In 2009, the CIS handled a total of 1.4 million cases which involved about 129 500 arrested persons (APs) and 1.2 million case-related properties. It also processed over 63 200 case charges submitted to the court in 2009.

5. During the discussions of the Panel on Security on the handling of custody searches of detainees, the Administration informed Members that HKPF would consider redeveloping the CIS to address limitations of the current system and to enhance its functions for recording and retrieving essential data. As an interim measure, partial enhancements were made to CIS from July 2008 to improve the recording of custody searches of detainees.

Constraints of the Existing CIS

6. Due to its outdated system architecture and design, the existing CIS is obsolescent and is unable to cope with the evolving operational, legal, social and IT requirements. It encounters the following problems and limitations –

- (a) Being in service for 13 years, the key system components of the CIS are out of production. Its hardware and software maintenance contract will expire in 2013, and could not be further extended or undertaken by other contractors due to aging and obsolescent issues.
- (b) Service consistency and procedure-compliance in HKPF are currently enforced through the issue of written instructions. The existing CIS has no system function that helps govern the case processing requirements to facilitate case progress

¹ For instance, the CIS interfaces data to Police Email Network for dissemination of crime and missing person messages, etc. among police formations. The CIS also passes crime intelligence information to Criminal Intelligence Computer System III for investigation purpose and passes traffic case details to the Force Information Datamart (FIND) to generate analytical report for traffic regions.

tracking and supervision control. HKPF has been taking proactive steps to tackle this problem, for example, by implementing improvement measures in respect of the custody searches of detainees, including introduction of new requirements for recording details of the custody searches into the CIS. However, due to the limited capacity of the CIS, other than the requirements for custody searches, HKPF currently relies on supervisory checks on case records to ensure compliance of other procedural requirements.

- (c) The divided system architecture of CIS with separate sets of database maintained by individual police formations as well as non-standardised data definition make case processing inefficient. It is also not equipped with analysis and reporting tools to enable the transformation of data into timely and comprehensive information for criminal analysis and action planning.

For example, the front desk police staff are unable to record case information for multiple APs involved in the same case in parallel, which causes unduly prolonged time for inputting particulars of APs involved in multiple arrests. Due to the divided architecture, information of missing person particulars has to be sent by multiple emails manually to different police stations and formations within HKPF for alert. Also, compilation of data relating to crime patterns and traffic accident/obstruction black spots can only be carried out manually.

- (d) Since the first launch of the system, there has been substantial increase in the business scope of CIS emerging from the continual changes of social factors and the implementation of new policies and legislation. Due to the exhaustion of its system capability, the existing CIS cannot be further enhanced to fully support the latest business requirements.

7. To enhance the operational efficiency and service quality of HKPF in carrying out its functions to maintain law and order, it is necessary to redevelop the existing CIS with enhanced system capacity and functions that would help HKPF face new challenges in the next decade.

Anticipated Benefits of the Proposed System

8. The proposed new CIS2 will ride on a new system architecture and design to address the problems faced by the existing CIS. In addition, it will consolidate seven in-house satellite IT systems², and will interface with other government departments' systems, such as information exchange with the Social Welfare Department on domestic incidents and with the Judiciary on warrant of arrest and subsequent actions. The intended new system features will bring the following anticipated benefits –

(a) Enhanced operational efficiency

With enhanced arrangement in parallel processing of APs involved in the same case, trail of detainee and property movement as well as compilation of management and crime reports, etc., the CIS2 will enhance HKPF's efficiency in daily operations as well as performance of more in-depth crime trend and pattern analysis. In addition, the beat patrol coverage can be improved as the reliance on ad hoc deployment of local patrolling officers to backup the Report Room operations would be reduced.

(b) Enhanced crime analysis and action planning

By establishing linkage with internal systems as well as developing standardised case data processing in the CIS2, supported by intelligence tools, the new system will enable timely and accurate retrieval of case data by different functions to meet HKPF's operational needs. The CIS2 will facilitate crime analysis, manpower planning for major incidents/events, as well as planning for anti-crime and traffic management operations and fight-crime campaigns. For instance, the CIS2, supported by Geographical Information System functions, will provide a holistic view of crime map for effective beat patrol and traffic control deployment.

² The seven in-house satellite IT systems are Modus Operandi Computer System, Crime Trend Analysis Program, FIND, Incident Mapping System, Crime Information Database on Police Intranet, Traffic Complaint Indexing System, and Traffic Warrants Index System.

(c) Assurance of service consistency and quality

The introduction of “procedure-driven” concept for the CIS2 by using technology solutions to automate business processes will oblige the frontline officers to comply with step-by-step procedures in the system such as in the handling of APs, found properties and summons. This new feature will also strengthen supervision.

(d) Enhanced security control and data protection

The introduction of a multiple-factor authentication mechanism and an audit trail measure for access to the CIS2 will enhance security control on data protection and strengthen integrity management.

(e) Expanded service channels for public

The CIS2 will provide for the establishment of an e-Report Centre which will offer better internet reporting service to the public for non-emergency incidents such as lost property. This will obviate the need for the public to visit local police stations for these incidents. In addition, the e-Report Centre will act as a centralised Call Centre with a dedicated phone number for appealing to the public on case information which is of public interest. It will also answer phone calls overflowed from busy Report Rooms.

9. With the enriched system content and functions, the user population of CIS2 will enlarge from the existing of 20 000 officers to 28 000 due to the enhancement in CIS features, such as automated business processes which allow more users to have direct access to the system at the same time.

10. The proposal to develop the new CIS2 has the support of the Office of the Government Chief Information Officer (OGCIO).

Financial Implications

Non-recurrent Expenditure

11. It is estimated that the implementation of CIS2 will require a non-recurrent cost of \$411.272 million over a seven-year period from 2010-11

to 2016-17 for the acquisition of computer hardware, software and related implementation services. A breakdown is at Annex A. In addition, the implementation of the project will entail a non-recurrent staff cost of \$124.497 million, involving a total of 2 318 man-months of police officers, civilian staff and IT staff for managing the project. HKPF will absorb the non-recurrent staff cost through internal redeployment.

Recurrent Expenditure

12. It is estimated that the recurrent expenditure for the CIS2 will be \$46.377 million in a full year from 2017-18 onwards after expiry of the free warranty of the full system in November 2016, which will be absorbed by HKPF within its existing resources. A breakdown is at Annex B. In addition, the project will also entail a recurrent staff cost of \$4.982 million per annum, representing a total of 66 man-months of police officers and IT staff to support the CIS2. HKPF will redeploy the existing staff to provide support to the proposed system. No additional recurrent staffing will be required.

Cost Savings/Avoidance

13. We estimate that the implementation of the proposed CIS2 will bring about total savings of \$93.347 million in a full year from 2016-17 onwards after CIS2 is launched in full, comprising -

- (a) realisable savings of \$11.060 million a year, mainly due to savings in the maintenance cost for the existing CIS;
- (b) notional savings of \$59.660 million a year, mainly due to savings in staff costs arising from more efficient administration of property items handled by Property Offices of police stations, and reduction in the time in handling APs in Report Rooms and the time of the staff in District Intelligence Sections spent in case coding work for crime analysis; and
- (c) cost avoidance of \$22.627 million a year, being the recurrent expenses for a revamped CIS, which only provides the same system functions as the current CIS and cannot leverage on the latest IT to provide better support to crime prevention and road safety management.

14. The realisable savings will be used to cover the recurrent expenditure for the CIS2. The notional savings in manpower will be internally redeployed to man the new e-Report Centre, discharge beat patrol duty, provide better support for intelligence gathering and extend the service hours of some of the Property Offices for claiming back lost properties by members of the public. In addition, we anticipate that there will be a one-off cost avoidance of \$219.825m for developing a revamped CIS.

Implementation Plan

15. Subject to the views of Members and the Finance Committee, we plan to replace the existing CIS by June 2014 and launching the CIS2 in full by November 2015. An implementation plan is at Annex C.

INITIAL IMPLEMENTATION OF VITRUALISATION TECHNOLOGY

Background

16. HKPF has a strength of about 36 000 staff including 28 000 regular disciplined staff. 60% of the regular disciplined staff is deployed on a shift basis in patrol related and crowd management duties whereas 40% carries out anti-crime and crime or traffic accident investigation duties.

17. The disciplined officers are supported by a number of information systems³ for preparation of office and case-related documents. Despite their computing needs, allocation of computer facilities to each of them is considered not cost-effective in view of their shift pattern and operation mobility. On the other hand, provision of shared computer facilities would cause problems in data accountability and security because case-related information should be limited to the officers involved.

18. HKPF's operational duties, which are mostly non-deskbound, call for high mobility and timely response to incidents/events. The current IT infrastructure does not support the mobile computing needs of police officers and often requires them to return to their office to access

³ Examples of the Force's information systems are CIS, Criminal Intelligence Computer System III and the FIND, etc.

relevant case data. For example, an AP is taken to the police station nearest to the location of arrest. If the case officer is from a different police formation, he is obliged to travel to his office to obtain the case-related information saved in the local computer facilities. Furthermore, Command Posts set up during public order events require mobile computers for on site use.

Proposed Enhancement of IT infrastructure for HKPF

19. In view of the requirements of police operations/duties aforementioned, it is necessary to enhance the IT infrastructure of HKPF with the aims of improving information accessibility, as well as enhancing operational mobility and efficiency under a secured computing environment. Virtualisation technology refers to a server computing model under which virtual workstations running on a remote central server will replace personal computers, and all of the programs, applications, processes and data used are kept and run centrally on the server ends. The use of virtualisation technology will enable police officers to access case information securely from their offices as well as other locations.

20. Riding on the existing Police Data Network (PDN), the new virtualisation infrastructure will be composed of servers for virtual workstations and a central data repository installed in two existing data centres in different locations. All users will be provided with their individual data storage compartments at the central data repository for secured processing and storage. To facilitate the viewing and processing of the information, front-line terminals with only a monitor for display and a keyboard/mouse for input, will be provided in offices of the police premises. Users can access their virtual workstations and data storage compartments by using any front-line terminal in or outside the offices to connect to the servers and central data repository through the PDN. The access to the data and authentication will be centrally controlled. A schematic diagram showing the operation of the proposed project is at Annex D.

21. The enhanced infrastructure, which will support data-centric architecture, will enable HKPF to manage the administration of servers, user access control, application change control and service maintenance centrally. The operational efficiency will be greatly enhanced through the increased provision of front-line terminals. Urgent deployment of

workstations for major events and ad hoc incidents can be achieved as no data is stored locally. The officers' operational mobility will be improved as they can readily access the information stored at the central server within or outside their offices in a secured manner. In addition, data security will be enhanced as all data will be processed and stored in the central server, and no data will be transferred to or can be downloaded from the front-line terminals. Last but not least, the use of virtual workstation infrastructure will achieve better utilisation of computing resources and minimise the need for onsite maintenance of software and hardware.

Implementation Approach

22. As the project will revamp the IT infrastructure and have impact on all disciplined staff, we propose a phased implementation approach. Subject to evaluation on the cost-effectiveness of the system, the project will go full swing to cover all 28 000 regular disciplined staff of HKPF. The Kowloon West (KW) Land Region is selected for the initial implementation as it covers different nature of the major policing duties. We will assess the timing and approach of subsequent implementation in other regions and Police Headquarters having regard to the experience gained from the implementation of the initial phase.

23. The proposal to implement the initial enhancement of IT infrastructure for HKPF by using virtual workstation in the KW Region has the support of OGCIO.

Financial Implications for the Initial Phase

Non-recurrent Expenditure

24. We estimate that the implementation of the proposed IT infrastructure enhancement project in the KW Region will incur non-recurrent expenditure of \$40.716 million over a period of three years from 2010-11 to 2012-13. A breakdown is at Annex E. In addition, the implementation of the project will entail a non-recurrent staff cost of \$2.167 million, involving about 47 man-months of police officers and IT staff for system analysis and development, and project management. HKPF will absorb the non-recurrent staff cost through internal redeployment.

Recurrent Expenditure

25. We estimate that the recurrent expenditure for the initial implementation will be \$3.989 million in a full year from 2013-14 onwards, which will be absorbed by HKPF within its existing resources. A breakdown is at Annex F. In addition, the project will entail a recurrent staff cost of \$760,000 per annum, representing a total of 24 man-months of IT staff for providing system support and administration. HKPF will redeploy the existing staff to provide support to the proposed system. No additional recurrent staffing will be required.

Cost Savings/Avoidance

26. We estimate that the proposed initial implementation will bring about total savings of \$21.478m in a full year from 2013-14 onwards, comprising -

- (a) realisable savings of \$89,000 a year, from saving in the maintenance cost of existing servers and personal computers;
- (b) notional savings of \$20.687 million a year, mainly due to staff savings as a result of reduction in staff effort for performing security and formation audits on the systems and terminals, for inspection of software installed in local computers, updating of anti-virus, supervision of computer repair works, and increased coverage of office automation as result of increased provision of front-line terminals for the police officers in the KW Region etc.; and
- (c) cost avoidance of \$702,000 a year, being the cost of replacement of desktop terminals in the next seven years' time.

27. The realisable savings will be used to cover the recurrent expenditure arising from the initial implementation. The notional savings in manpower will be internally redeployed within the KW Region for core policing duties.

Implementation Plan

28. We plan to adopt the virtualisation environment in KW Region in June 2012. An implementation plan is at Annex G.

ADVICE SOUGHT

29. Subject to Members' views, we plan to seek funding approval from the Finance Committee for the two proposed projects in May 2010.

**Security Bureau
Hong Kong Police Force
April 2010**

Non-recurrent Expenditure for the Proposed CIS2

Cost Item	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	Total
	\$'000							
(a) Hardware	-	812	5,165	121,816	1,600	-	-	129,393
(b) Software	-	4,876	13,178	66,367	625	-	-	85,046
(c) Implementation services	-	9,549	19,097	-	65,653	26,980	20,795	142,074
(d) Contract staff	1,166	4,969	4,969	4,969	2,031	587	277	18,968
(e) Site preparation	-	-	4,248	3,089	-	-	-	7,337
(f) Communication services	-	-	-	7,006	73	-	-	7,079
(g) Consumables	-	-	-	792	528	-	-	1,320
(h) Training	-	-	-	188	283	-	-	471
Sub-total	1,166	20,206	46,657	204,227	70,793	27,567	21,072	391,688
(i) Contingency [5% of (a) to (h)]	58	1,010	2,333	10,211	3,540	1,378	1,054	19,584
Total	1,224	21,216	48,990	214,438	74,333	28,945	22,126	411,272

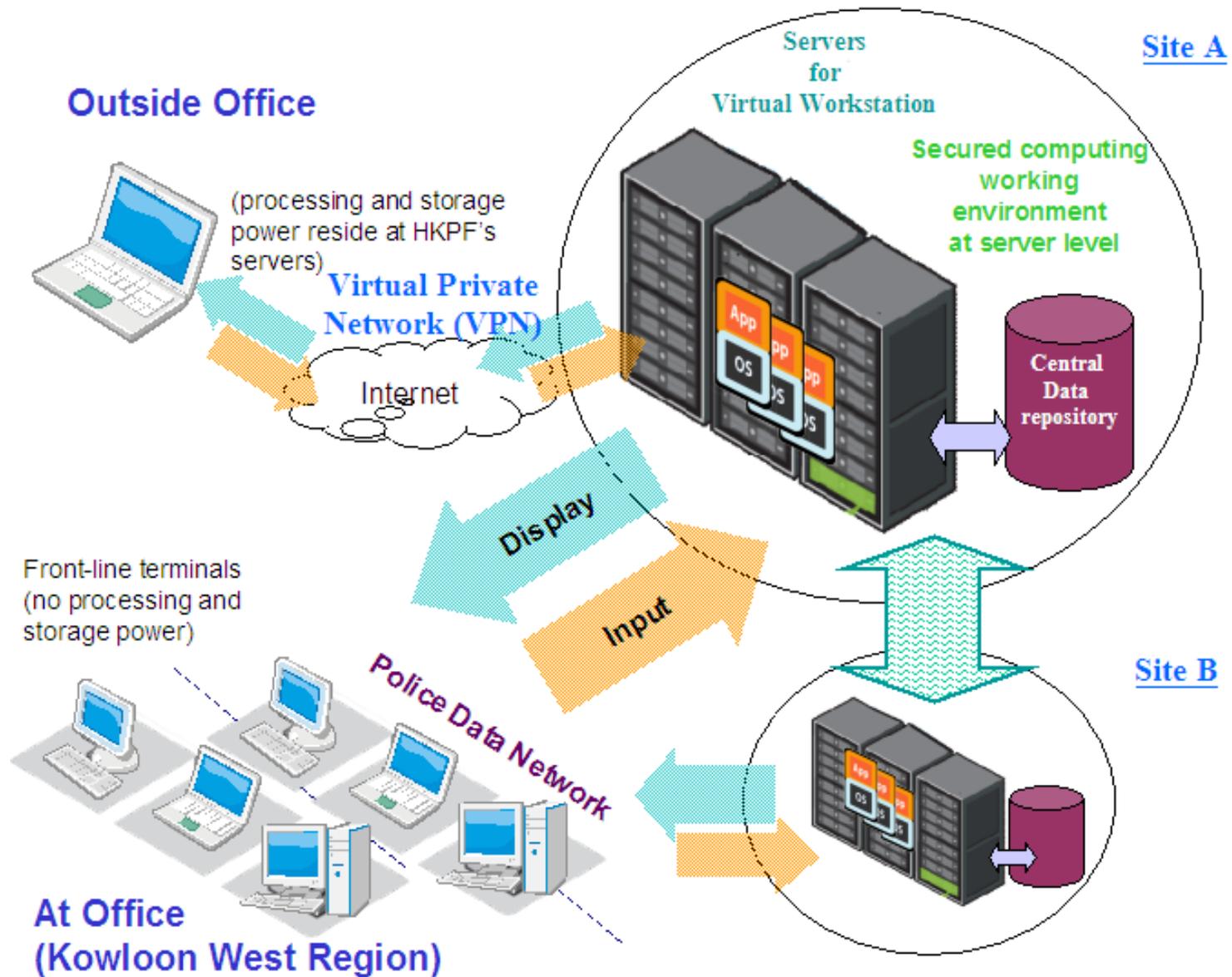
Recurrent Expenditure for the proposed CIS2

Cost Item	2017-18 onwards
	\$'000
(a) Hardware maintenance	19,474
(b) Software license and maintenance	14,703
(c) Contract services for ongoing system support and maintenance	7,907
(d) Communication services	3,989
(e) Consumables	304
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Total	46,377

Tentative Implementation Schedule of the Proposed CIS2

Activity	Target completion date
(a) Tender and specification preparation	June 2010
(b) Tendering and award of contract	April 2011
(c) System analysis and design	April 2012
(d) System development and roll-out of existing CIS functions	June 2014
(e) System implementation and roll-out of e-Report Centre	June 2015
(f) Roll-out of other new system functions	November 2015

Virtual Workstation Schematic Diagram



**Non-recurrent Expenditure for the Initial Implementation of
Virtual Workstation in KW Region**

Cost Item	2010-11	2011-12	2012-13	Total
	\$'000	\$'000	\$'000	\$'000
(a) Hardware	---	11,585	4,965	16,550
(b) Software	---	5,652	2,423	8,075
(c) Communication network	---	4,921	---	4,921
(d) Implementation services	---	1,050	994	2,044
(e) Contract staff	109	1,118	---	1,227
(f) Site preparation	---	3,117	---	3,117
(g) Training	---	294	---	294
(h) Consumables	---	245	---	245
(i) Others ⁴	---	550	---	550
(j) Contingency (about 10%)	12	2,845	836	3,693
Total	121	31,377	9,218	40,716

⁴ There are distributed servers at the Regions and it is necessary to extract the data from these servers to the centralized data centre under virtualisation environment.

**Recurrent Expenditure for the Initial Implementation of
Virtual Workstation in KW Region**

Cost Item	2013-14 onwards \$'000
(a) Hardware maintenance	2,196
(b) Software licence and maintenance	400
(c) Communication network	1,368
(d) Consumables	25
Total	3,989

**Tentative Implementation Schedule for the Initial Implementation of
Virtual Workstation in KW Region**

Activity	Target Completion Date
(a) Tender and specification and preparation	October 2010
(b) Tendering and award of contract	September 2011
(c) System installation	April 2012
(d) Data migration	May 2012
(e) System live run	June 2012