

## **ITEM FOR FINANCE COMMITTEE**

### **CAPITAL WORKS RESERVE FUND**

#### **HEAD 710 – COMPUTERISATION**

##### **Hong Kong Police Force**

##### **New Subhead “Enhancement of the Information Technology Infrastructure by Using Virtual Workstation (Initial Implementation)”**

Members are invited to approve a new commitment of \$40,716,000 for introducing the virtual workstation in the Kowloon West Region of the Hong Kong Police Force.

### **PROBLEM**

The Hong Kong Police Force (HKPF) needs to enhance the accessibility, mobility and data security of information technology (IT) support for its disciplined officers to better meet their operational needs.

### **PROPOSAL**

2. The Commissioner of Police, with the support of the Secretary for Security and the Government Chief Information Officer, proposes to create a new commitment of \$40,716,000 to implement the initial enhancement of HKPF’s IT infrastructure by introducing the virtualisation technology in the Kowloon West (KW) Region.

### **JUSTIFICATION**

#### **The Need to Enhance the IT Infrastructure**

3. HKPF has a strength of about 36 000 staff including 28 000 regular disciplined staff. The regular disciplined officers are deployed in over 250 different divisions/formations throughout the territory to provide round-the-clock policing

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services. About 60% of them are deployed on a shift basis in patrol-related and crowd management duties, whereas 40% carry out anti-crime and crime or traffic accident investigation duties. The investigation officers are on call after office hours to respond to the new developments in their responsible cases.

4. The nature of police duties is primarily non-deskbound and calls for high mobility and timely response to incidents/events. As part of their work, police officers often need to gain access to a number of information systems<sup>Note</sup>. Moreover, they need to prepare office and case-related documents regularly. Given that the handling of various cases often involve the processing of a lot of sensitive information and personal data, police officers are required to pay due regard to data accountability and security. Therefore, the IT needs of HKPF will need to take into account not only accessibility and mobility, but also much more stringent requirements for data security.

5. At present, HKPF, like many other departments and public organisations, provides networked/standalone computer facilities, such as desktop personal computers, notebook computers, etc, to meet the general IT needs of individual officers. In light of the shift pattern of police officers, allocation of computer facilities to each of disciplined officers is considered not cost-effective, and shared computer facilities are being provided. To ensure data security, HKPF has been limiting the growth of shared computer facilities and put in place comprehensive information security measures, such as periodic inspection of information resided in shared computer terminals, to mitigate information leakage risk. A better long-term solution is however necessary to further improve both accessibility to computing facilities and data security. The current IT infrastructure needs enhancement also in terms of supporting the operation mobility needs of police officers. For example, while an arrested person is taken to the police station nearest to the place of arrest, the case officer is obliged to travel back to his office to obtain the case-related information saved in the local computer facilities, as the case-related information can only be accessed from their own office in general. Another example is the setting up of mobile Command Posts, which are often required during public order events to maintain order and for ad hoc incidents like natural disasters.

6. In view of the special operational needs of HKPF, the current IT infrastructure is not a satisfactory option to cater for its present day requirements in terms of operation efficiency, mobility and data security.

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<sup>Note</sup> Examples of HKPF's information systems are Communal Information System, Criminal Intelligence Computer System III and the Force Information Datamart.

### **The Proposed Virtual Workstations and Its Benefits**

7. In order to address the special IT needs of police officers and further improve the operational efficiency of HKPF as a whole, the gradual migration from the provision of shared computer facilities to the allocation of virtual workstations to individual officers in needs of such support is considered the best way forward. The allocation of virtual workstations is based on the virtualisation technology which refers to a server computing model under which virtual workstations running on a remote central server will replace personal computers, and all the programmes, application 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 in their offices as well as other locations. This infrastructure change will build up a data-centric architecture that would provide greater flexibility to cater for increasing computing needs and timely response to ever-changing operational requirements in a secured environment.

8. Riding on the existing Police Data Network (PDN), the new virtualisation infrastructure will be composed of servers for virtual workstations, and central data repository installed in two existing data centres in different locations. All users will be provided with 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 and diskless notebooks with only a monitor for display and a keyboard/mouse for input in the offices of the police premises will be provided. Users can access their virtual workstations and data storage compartments by using a front-line terminal within or outside the office 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 for the proposed project illustrating the above operation is at

Encl. 1 Enclosure 1.

9. As the virtual workstation project will revamp the existing IT infrastructure and have impact on all disciplined staff, we propose a phased implementation approach. Subject to evaluation of the cost-effectiveness of the system, we plan to roll out the virtual workstation project to ultimately cover all 28 000 regular disciplined staff of HKPF. The KW Region, which has 4 600 regular disciplined staff, 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.

10. The proposed IT infrastructure enhancement with the virtual workstation environment will bring the following anticipated benefits –

(a) Increased accessibility

The number of computer terminals (including front-line terminals and diskless notebooks) in KW Region will be increased from about 1 100 by more than 60% to around 1 800 after the initial implementation of the infrastructure enhancement. Accessibility will be greatly enhanced with the increased number of front-line terminals and notebooks with secured processing and storage environment at the server end. Such terminal to officer ratio is considered appropriate and sufficient.

(b) Enhanced operational efficiency and mobility

The operational efficiency will be greatly enhanced through the increased provision of front-line terminals, and individual processing and storage compartment at the central server. Case-related and general office documents can be prepared more efficiently and in a timelier manner. The officers' operational mobility is also improved as they can readily access the information stored at the central server within or outside their offices. With urgent deployment of the virtual workstations, mobile computing facilities or command posts for major events and ad hoc incidents can also be set up within a much shorter time.

(c) Enhanced data security and confidentiality

With the proposed virtual workstation infrastructure in place, all information/documents under processing will only reside at the secured data storage compartments in data centres, and storage in individual terminal is not permitted. Since all data would be processed and stored in the central server, only screen image would be transferred to the front-line terminals through the secured data channel, whether the officer is accessing HKPF's information within or outside the police premises. As no data would be transferred or downloaded to the front-line terminals, officers would in general not be able to carry data on any external storage device such as USB thumb drives, except with special approval due to operational need. Furthermore, each officer can gain access to only his own storage compartment in the data centres with an authentication mechanism. As a result of these features, information confidentiality can be ensured and data leakage risk would be mitigated.

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(d) Central desktop management and deployment

Desktop virtualisation removes the dependency on a specific local terminal configuration. With the consolidated IT infrastructure, administration of servers, user access control and application change control (e.g. upgrade of software) can be performed centrally in the data centres. As no data is stored locally, the use of virtual workstation will also minimise the need for on-site maintenance of hardware and simplify the procedure for workstation disposal and replacement.

(e) Higher service availability

With the provision of dual site infrastructure in the long run, sharing of loading between the computer resources in the two data centres is possible and mutual backup can be done to ensure availability and resilience. It can protect against planned downtime in the event of scheduled maintenance, and provide resilience in spite of hardware and software failure. Furthermore, in case of failure of front-line terminals, end users can continue to work by simply replacing the failed terminals.

(f) Better utilisation of resources

With the provision of a secured virtual workstation infrastructure, users can access their own virtual workstations from any front-line terminal and it is not necessary to provide each disciplined officer with a designated front-line terminal. In addition, the infrastructure can allocate suitable computing resources to active and inactive users for better utilisation of the resources.

### **Cost Savings/Avoidance**

11. We estimate that the proposed initial implementation of the virtual workstation project will bring about annual savings of \$21,478,000 per annum from 2013-14 onwards, comprising –

(a) Realisable savings of \$89,000 per annum

The realisable savings represent savings from the maintenance cost of the existing servers and personal computers. The savings will be used to cover part of the recurrent expenditure of the proposed enhancement.

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- (b) Notional savings of \$20,687,000 per annum

With the increased provision of front-line terminals and enhanced functions of the IT infrastructure, notional savings in staff effort will be achieved through increased coverage of office automation and reduction in staff effort for performing security and formation audits on the systems and terminals, inspecting software installed in local computers, updating anti-virus, and supervising computer repair works. The notional savings in manpower, which are fragmented over different police stations and offices in the KW Region, will be internally redeployed for core policing duties in the region.

- (c) Cost avoidance of \$702,000 per annum

The cost avoidance arises mainly from avoidance of the replacement of desktop terminals in the next seven years.

Encl. 2 12. A cost and benefit analysis for the proposed virtual workstation project is at Enclosure 2.

**FINANCIAL IMPLICATIONS**

**Non-recurrent Expenditure**

13. We estimate that the proposed implementation of the virtual workstation project in the KW Region will require a non-recurrent capital cost of \$40,716,000 over a three-year period from 2010-11 to 2012-13, with breakdown as follows -

	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

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	2010-11	2011-12	2012-13	Total
	\$'000	\$'000	\$'000	\$'000
(g) Training	-	294	-	294
(h) Consumables	-	245	-	245
(i) Others	-	550	-	550
Subtotal	109	28,532	8,382	37,023
(j) Contingency	12	2,845	836	3,693
<b>Total</b>	<b>121</b>	<b>31,377</b>	<b>9,218</b>	<b>40,716</b>

14. On paragraph 13(a) above, the estimate of \$16,550,000 is for the acquisition of computer hardware including servers, corporate networked file storage, thin clients, load balancer, backup equipment and optical fibre switches.

15. On paragraph 13(b) above, the estimate of \$8,075,000 is for the acquisition of computer software, including operating system, virtual workstation system software, office automation applications and file encryption software.

16. On paragraph 13(c) above, the estimate of \$4,921,000 is for the acquisition of network equipment to enhance the existing backbone network of HKPF to cater for the data synchronisation between the two data centers.

17. On paragraph 13(d) above, the estimate of \$2,044,000 is for system implementation services, including system installation, customisation of virtual workstation system, data migration, system design, and project management.

18. On paragraph 13(e) above, the estimate of \$1,227,000 is for the engagement of contract staff to supplement the in-house project management team to provide support in project planning, procurement, system acceptance and monitoring the performance of the contractor for implementation services.

19. On paragraph 13(f) above, the estimate of \$3,117,000 is for site preparation for accommodating the servers and equipment, including provision of electricity supply facilities, trunking and cabling.

20. On paragraph 13(g) above, the estimate of \$294,000 is for the training of system administrators on system administration and support for the new infrastructure.

21. On paragraph 13(h) above, the estimate of \$245,000 is for the acquisition of backup tapes for the backup of system and user data.

22. On paragraph 13(i) above, the estimate of \$550,000 is for the acquisition of support services for data extraction. There are distributed servers at the regions and it is necessary to extract the data from these servers to the centralised data centre under virtualisation environment.

23. On paragraph 13(j) above, the estimate of \$3,693,000 represents about 10% contingency on the items set out in paragraphs 13(a) to (i) above.

#### **Other Non-recurrent Expenditure**

24. The proposed implementation of the virtual workstation project will entail an additional non-recurrent staff cost of \$2,167,000. The cost represents a total of 47 man-months of police officers and IT staff for system analysis and development, and project management. HKPF will absorb the requirements.

#### **Recurrent Expenditure**

25. We estimate that the recurrent expenditure arising from the virtual workstation project will be \$3,989,000 per annum from 2013-14 onwards. Such requirements will be reflected in the Estimates of the relevant years, with breakdown as follows -

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

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26. On paragraph 25(a) above, the estimated annual expenditure of \$2,196,000 is for the provision of hardware maintenance for the front-line terminals, servers and networked file storage.

27. On paragraph 25(b) above, the estimated annual expenditure of \$400,000 is for the licence fees and support services for the system software.

28. On paragraph 25(c) above, the estimated annual expenditure of \$1,368,000 is for the rental of communication data lines, fee for 3G network and maintenance of additional network equipment.

29. On paragraph 25(d) above, the estimated annual expenditure of \$25,000 is for the acquisition of tapes for data backup.

30. The virtual workstation project will also entail a recurrent staff cost of \$760,000, representing a total of 24 man-months of IT staff for providing centralised desktop management and support, which is the same as that for the current computer facilities. The existing staff will provide daily support for the virtualisation environment and no additional recurrent staffing will be required.

## IMPLEMENTATION PLAN

31. We plan to implement the proposed virtual workstation project according to the following schedule –

<b>Activity</b>	<b>Target completion date</b>
(a) Tender and specification 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

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**PUBLIC CONSULTATION**

32. We consulted the Legislative Council Panel on Security on the proposal on 13 April 2010. Members raised no objection to submitting it to the Finance Committee for funding approval.

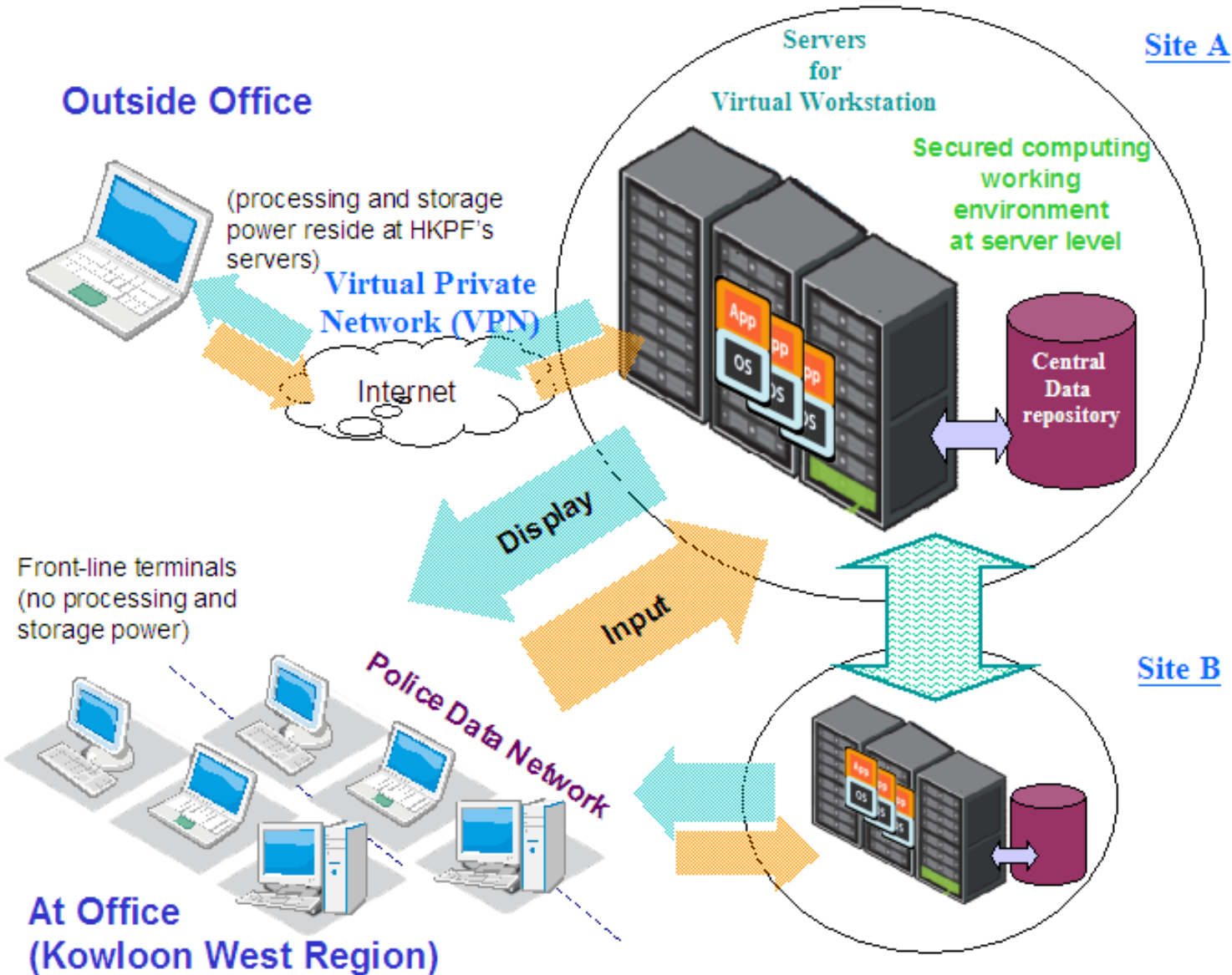
**BACKGROUND**

33. HKPF adopts a distributed IT infrastructure to support all computer facilities connected to the Local Area Networks (LAN) in the police premises covering Police Headquarters, regions, districts, divisions and offices. These LANs are riding on the PDN, which is the Force-wide data communication network for the IT applications. Over the years, the IT infrastructure was incrementally enhanced to cater for the new developments of the major systems. With the expanding demand in terms of accessibility, mobility and security, latest technology should be introduced to fundamentally enhance the IT infrastructure.

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Security Bureau  
May 2010

### Virtual Workstation Schematic Diagram



**Cost and Benefit Analysis for the Proposed Virtual Workstation of IT Infrastructure**

		Cash flow (\$'000)										
		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	Total
<b>Cost</b>												
Non-recurrent												
- Expenditure		121	31,377	9,218	-	-	-	-	-	-	-	40,716
- Staff cost		722	722	723	-	-	-	-	-	-	-	2,167
	Sub-total	843	32,099	9,941	-	-	-	-	-	-	-	42,883
Recurrent												
- Expenditure		-	-	-	3,989	3,989	3,989	3,989	3,989	3,989	3,989	27,923
	Sub-total	-	-	-	3,989	3,989	3,989	3,989	3,989	3,989	3,989	27,923
<b>Total cost</b>		<b>843</b>	<b>32,099</b>	<b>9,941</b>	<b>3,989</b>	<b>3,989</b>	<b>3,989</b>	<b>3,989</b>	<b>3,989</b>	<b>3,989</b>	<b>3,989</b>	<b>70,806</b>
<b>Savings</b>												
Realisable savings		-	-	-	89	89	89	89	89	89	89	623
Notional savings		-	-	-	20,687	20,687	20,687	20,687	20,687	20,687	20,687	144,809
Cost avoidance		-	-	-	702	702	702	702	702	702	702	4,914
<b>Total savings</b>		-	-	-	<b>21,478</b>	<b>21,478</b>	<b>21,478</b>	<b>21,478</b>	<b>21,478</b>	<b>21,478</b>	<b>21,478</b>	<b>150,346</b>
<b>Net savings</b>		<b>-843</b>	<b>-32,099</b>	<b>-9,941</b>	<b>17,489</b>	<b>17,489</b>	<b>17,489</b>	<b>17,489</b>	<b>17,489</b>	<b>17,489</b>	<b>17,489</b>	<b>79,540</b>
<b>Net cumulative savings</b>		<b>-843</b>	<b>-32,942</b>	<b>-42,883</b>	<b>-25,394</b>	<b>-7,905</b>	<b>9,584</b>	<b>27,073</b>	<b>44,562</b>	<b>62,051</b>	<b>79,540</b>	

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