GS1
Hong Kong

Establishing an EPC Network Infrastructure to Enable End-to-End Supply Chain Visibility
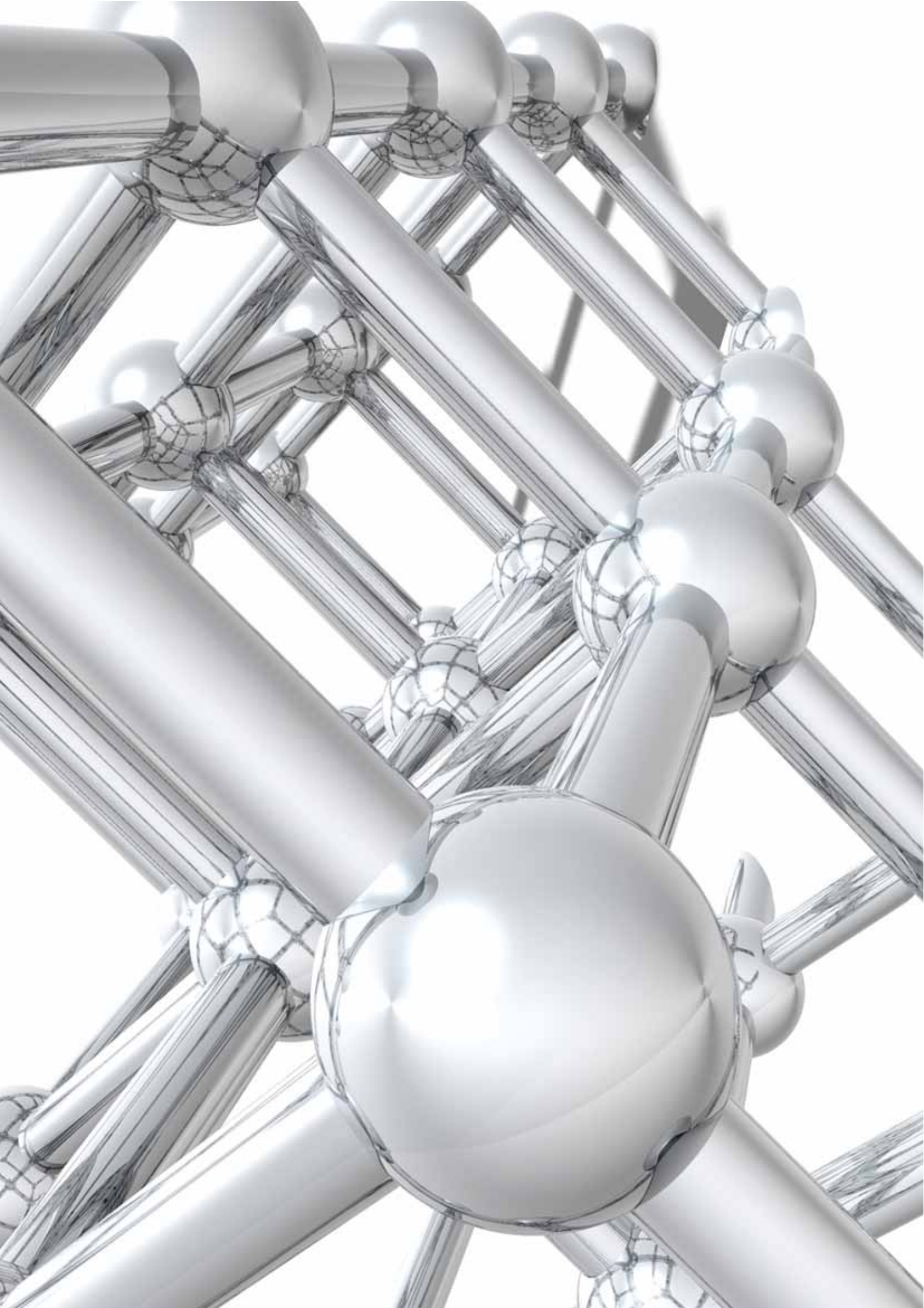
建立產品電子代碼網絡以提高整體供應鏈透明度

Case Sharing 案例分享

GS1 EPCglobal

Acknowledgement 鳴謝

The project "Establishing an EPC Network Infrastructure to Enable End-to-End Supply Chain Visibility" (hereafter "supply chain visibility" project) has received tremendous support from different industry players of different sectors and leading institutes, which is essential for the project's success. GS1 Hong Kong hereby gives sincere gratitude to the following companies and organizations:

「建立產品電子代碼網絡以提高整體供應鏈透明度」計劃的成功，實得到各大企業與院校的鼎力支持，香港貨品編碼協會在此特別向以下公司和機構表示衷心謝意，包括：

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Preface

Globalization of businesses, proliferation of product variety, increasing complexity of many-to-many supply networks, and shortening of product life cycles are among key forces compelling many organizations to examine and re-invent their supply chain strategies.

One key element for this supply chain revolution is the end-to-end supply chain visibility, allowing any companies in the supply chain to monitor and track the whereabouts of products anytime and anywhere.

GS1 Hong Kong undertook a major project on supply chain visibility in year 2005. The project is funded by Hong Kong SAR Government's Innovation and Technology Commission under the former Guangdong-Hong Kong Technology Cooperation Funding Scheme(TCFS). The project pioneers the building of the EPC infrastructure, integrating it with real industry users of global supply chain in 4 pilots, capturing the key learning for the industry, with the ultimate goal to harmonize the logistics flow and information flow in the region, strengthening the role of Pan Pearl River Delta Region (PPRD) including Hong Kong as the global sourcing center.
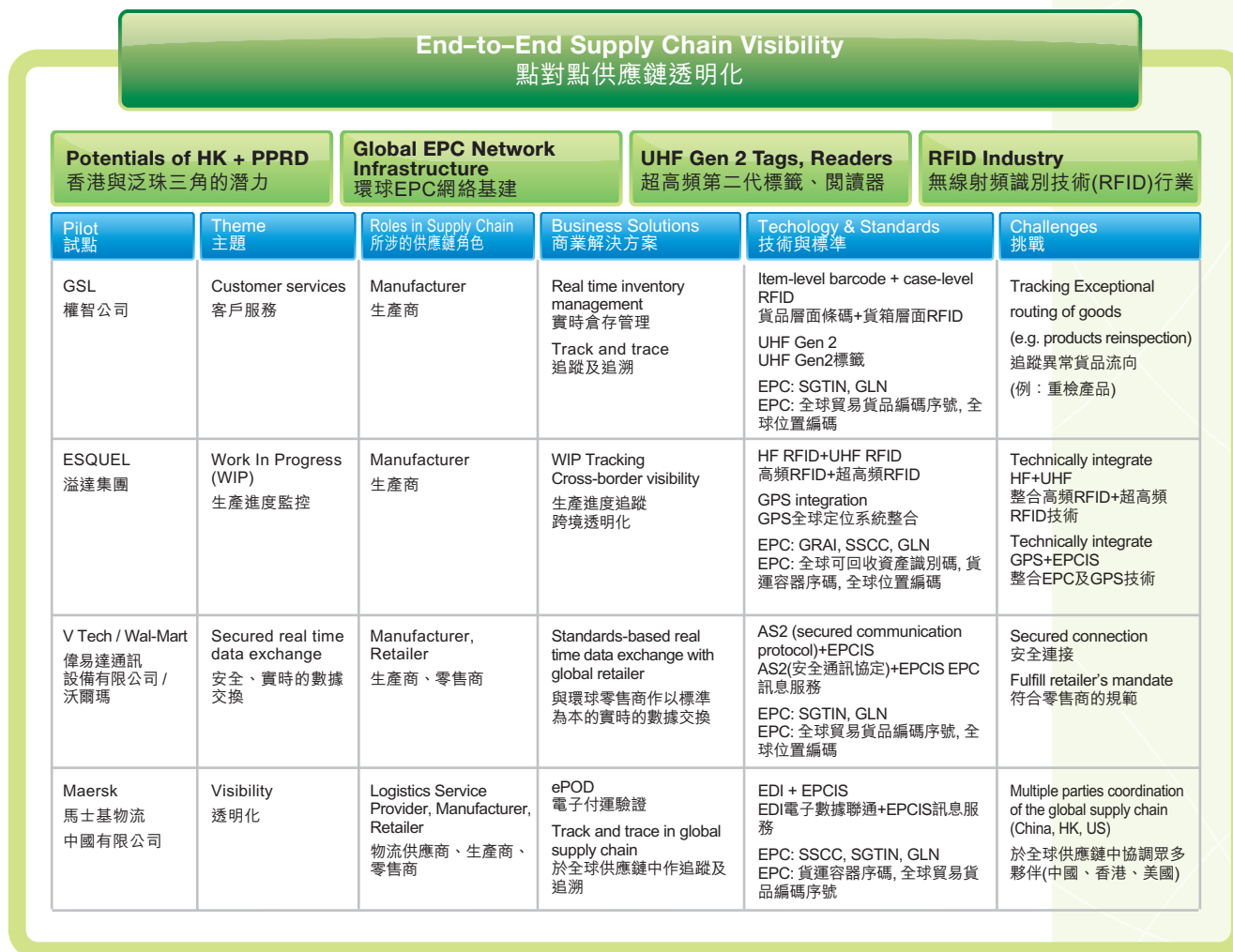
前言

全球化的商業活動、不斷遞增的產品總類、愈趨複雜的供應網絡、以及短暫的產品生命週期均是眾多機構需面對及重新探討其供應鏈策略的主要課題。

在供應鏈革命中其中一個重要的元素就是點對點供應鏈透明化，讓供應鏈上任何公司都能於任何時間和任何地方監察及追蹤其產品所在。

香港貨品編碼協會於2005年肩負起一個重要的點對點供應鏈透明化項目。這項目由香港特別行政區政府創新科技署轄下前稱「粵港科技合作資助計劃」資助。項目率先建構一個產品電子代碼網絡（下稱EPC網絡），並透過4個環球供應鏈試點計劃與真正的業界用戶整合；令泛珠三角區內的物流與資訊流達至同步，強化這地區及香港作為環球採購中心。

The diagram here depicts all key elements of the pilots documented in this pilot casebook.
下圖描述於這本案例分享文件中所包含試點計劃的重要元素。

End–to–End Supply Chain Visibility
點對點供應鏈透明化

| Potentials of HK + PPRD
香港與泛珠三角的潛力 | | Global EPC Network Infrastructure
環球EPC網絡基建 | | UHF Gen 2 Tags, Readers
超高頻第二代標籤、閱讀器 | RFID Industry
無線射頻識別技術(RFID)行業 |

Pilot 試點	Theme 主題	Roles in Supply Chain 所涉的供應鏈角色	Business Solutions 商業解決方案	Techology & Standards 技術與標準	Challenges 挑戰
GSL 權智公司	Customer services 客戶服務	Manufacturer 生產商	Real time inventory management 實時倉存管理 Track and trace 追蹤及追溯	Item-level barcode + case-level RFID 貨品層面條碼+貨箱層面RFID UHF Gen 2 UHF Gen2標籤 EPC: SGTIN, GLN EPC: 全球貿易貨品編碼序號, 全球位置編碼	Tracking Exceptional routing of goods (e.g. products reinspection) 追蹤異常貨品流向 (例：重檢產品)
ESQUEL 溢達集團	Work In Progress (WIP) 生產進度監控	Manufacturer 生產商	WIP Tracking Cross-border visibility 生產進度追蹤 跨境透明化	HF RFID+UHF RFID 高頻RFID+超高頻RFID GPS integration GPS全球定位系統整合 EPC: GRAI, SSCC, GLN EPC: 全球可回收資產識別碼, 貨運容器序碼, 全球位置編碼	Technically integrate HF+UHF 整合高頻RFID+超高頻RFID技術 Technically integrate GPS+EPCIS 整合EPC及GPS技術
V Tech / Wal-Mart 偉易達通訊設備有限公司 / 沃爾瑪	Secured real time data exchange 安全、實時的數據交換	Manufacturer, Retailer 生產商、零售商	Standards-based real time data exchange with global retailer 與環球零售商作以標準為本的實時的數據交換	AS2 (secured communication protocol)+EPCIS AS2(安全通訊協定)+EPCIS EPC訊息服務 EPC: SGTIN, GLN EPC: 全球貿易貨品編碼序號, 全球位置編碼	Secured connection 安全連接 Fulfill retailer's mandate 符合零售商的規範
Maersk 馬士基物流中國有限公司	Visibility 透明化	Logistics Service Provider, Manufacturer, Retailer 物流供應商、生產商、零售商	ePOD 電子付運驗證 Track and trace in global supply chain 於全球供應鏈中作追蹤及追溯	EDI + EPCIS EDI電子數據聯通+EPCIS訊息服務 EPC: SSCC, SGTIN, GLN EPC: 貨運容器序碼, 全球貿易貨品編碼序號	Multiple parties coordination of the global supply chain (China, HK, US) 於全球供應鏈中協調眾多夥伴(中國、香港、美國)

For easy understanding of the key learning from the 4 pilots, the pilots are presented in a specific order. Readers will learn the basics of how EPC/RFID can be applied within a single company on their finished products as illustrated in the GSL pilot first. Then, readers get to know more on how EPC/RFID can be applied in the business operation of an enterprise in the case of Esquel Group pilot for WIP (work-in-process) "tracking" within a company. After understanding the basics of applying EPC/RFID within an enterprise, readers are exposed to how EPC / RFID application can be extended to upstream or downstream partners in the supply chain as illustrated in VTech/Wal-Mart international pilot. Finally, readers can learn on how EPC/RFID can be applied to achieve the end-to-end supply chain visibility, from manufacturing process in mainland China, consolidation process in Hong Kong, and the de-consolidation process in United States, involving the coordination of 4 companies playing different roles in the supply chain as elaborated in the Maersk pilot.

本案例分享的試點計劃的先後排序是為了讓讀者更容易理解4個試點計劃所獲的重要知識。讀者可從權智公司試點中理解如何於一間公司成品上應用產品電子代碼 / 無線射頻識別技術(下稱EPC / RFID) 的基本要素。接著，讀者能於溢達集團案例中知道如何於作業流程中採納EPC /RFID作企業生產監控(Work In Progress, WIP) 。理解了於公司應用EPC /RFID的基本要素後，讀者進一步於偉易達通訊設備有限公司及沃爾瑪國際試點案例中清楚認識到EPC /RFID的採納能延伸至環球供應鏈的上游和下游。最後，馬士基物流中國有限公司案例讓讀者體驗如何應用EPC /RFID技術來達至點對點供應鏈透明化；由中國內地的生產過程到香港集貿流程，及至美國分貨流程，當中涉及4間扮演不同供應鏈角色公司間的協調。
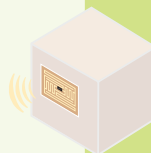
Let's start the EPCnetwork Journey!
與我們一同展開EPC網絡之旅！

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Background 背景

1.1 End-to-End Supply Chain Visibility

Globalization of business, proliferation of product variety, increasing complexity of many-to-many supply networks and the shortening of product life cycles are among the key forces compelling companies to examine and re-invent their supply chain strategies, driving new operation models. Effective monitoring and tracking of whereabouts of products, which relies on global end-to-end supply chain visibility, is one of their greatest concerns for the revolution.

To tackle these challenges, the Auto ID-Labs carried out a research in 2003. A set of solution based on a uniquely numbered low-cast tag and a network similar to the Internet holding relevant supply chain data was established to identify the object, capture data and to exchange the information. The research included detail specifications for :

1. The Electronic Product Code™ (EPC) Numbering Scheme
2. Proposals for the Network Component
3. Passive Tags and Readers

While leading retailers world-wide could already capture consumer demand data by barcode scanning at the POS (point of sales), feeding the data back to upstream distribution centers and manufacturers, this new EPC-enabled supply chain visibility will for the first time allow all the companies (retailers, logistics providers, manufacturers) to synchronize the consumer demand with the real time inventory movement in the entire supply chain, equipping them with tremendous capabilities for achieving the near-perfect supply chain, realizing the many benefits such as reducing unrealistic "safety stocks" (and its costs), which tend to increase significantly when moving up the supply chain ("bullwhip effect"), while at the same time improving service levels to the next customer in the chain with real time information.

1.1 點對點供應鏈透明化

全球化的商業活動、不斷遞增的產品總類、愈趨複雜的供應網絡，以及短暫的產品生命週期均是眾多企業需面對革新營運模式及重新探討其供應鏈策略的主要議題。具效率的監控及追蹤其貨品於供應鏈內的流向，實有賴環球點對點供應鏈透明化，這亦是企業改革最關注的。

為了迎接這些挑戰，Auto-ID實驗室於2003年展開研究，目標是建立一套獨一無二已編碼的標籤和一個類似互聯網的網絡來貯存相關供應鏈數據，藉以識別物件、擷取數據和交換資料。研究包括詳細規格：

1. EPC編碼
2. 網絡元件建議書
3. 被動式標籤和閱讀器

當領先的環球零售商已開始於銷售點(Point of Sales, POS)利用條碼掃描擷取消費者的需求數據，把採集數據回饋下游配送中心及生產商，革新、透明化的EPC供應鏈將首次容許所有公司（零售商、物流供應商、生產商）能同步於整條供應鏈上獲取消費者需求與實時倉存資料，使公司們擁有大量為達至近乎完美的供應鏈的能力，體驗如減少不切實際的「安全庫存」(及其成本) 為供應鏈所帶來的長鞭效應(bullwhip effect)；同時實時資料亦改善對客戶的服務水準。

1.2   Potentials of Hong Kong and the Pan Pearl River Delta Region, China

China, especially the Pan Pearl River Delta Region, (PPRD[1]), as the worlds manufacturing base is one major starting point of global supply chains. Hong Kong, with its well-developed logistics services and related infrastructure, is an important logistics hub in the Asia Pacific region for the goods exported from Mainland China to the global buyers.

While many discussions about the integration of PPRD have been focusing on the hardware infrastructure such as railways, roads and airports, real integration within the region builds on a synchronized flow of information as well.
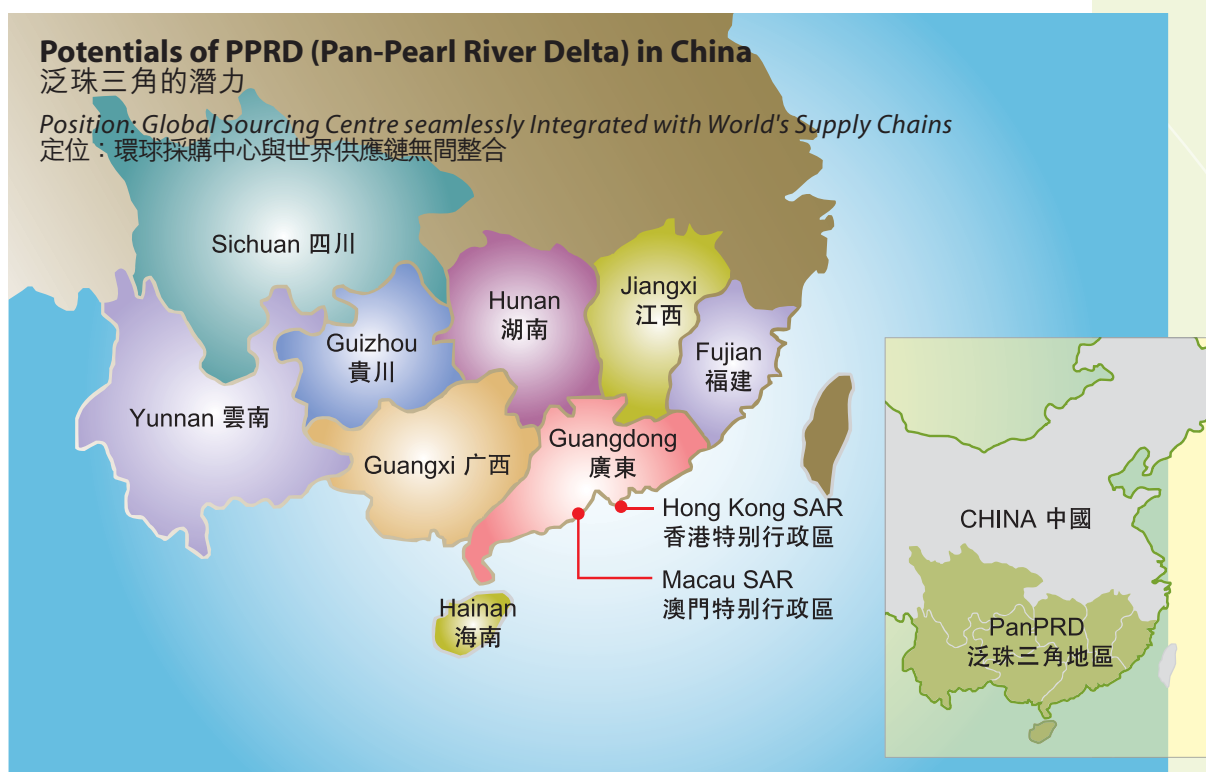
This new EPC-enabled end-to-end supply chain visibility could significantly harmonize the logistics movement with information flow, forming an important pillar for the region in the process global supply chain integration.

1.2 香港與中國泛珠三角的潛力

中國，特別是泛珠三角地區[1]是世界其中一個生產基地，亦是環球供應鏈之主要源頭。香港，其完善發展的物流服務及相關基建令香港能成為亞太地區中中國內地出口往世界的重要物流中心。

當大部份泛珠三角整合的討論集中在硬件上，如鐵道、道路及機場，真正的地區整合亦建築於資訊同步化上。

革新、透明化的EPC供應鏈能使物流在相當大的程度上與資訊流同步協調，為地區與世界供應鏈整合建立重要支柱。

Potentials of PPRD (Pan-Pearl River Delta) in China
泛珠三角的潛力

Position: Global Sourcing Centre seamlessly Integrated with World's Supply Chains
定位：環球採購中心與世界供應鏈無間整合

Sichuan 四川

Hunan 湖南

Jiangxi 江西

Guizhou 貴川

Fujian 福建

Yunnan 雲南

Guangxi 廣西

Guangdong 廣東

Hong Kong SAR 香港特別行政區

Macau SAR 澳門特別行政區

Hainan 海南

CHINA 中國

PanPRD 泛珠三角地區

[1] PPRD stands for Pan-Pearl River Delta, a major region in South part of China, comprises Hong Kong Special Administrative Region, nine provinces/regions in mainland China - Fujian, Jiangxi, Hunan, Guangdong, Guangxi, Hainan, Sichuan, Guizhou and Yunnan, and Macao Special Administrative Region
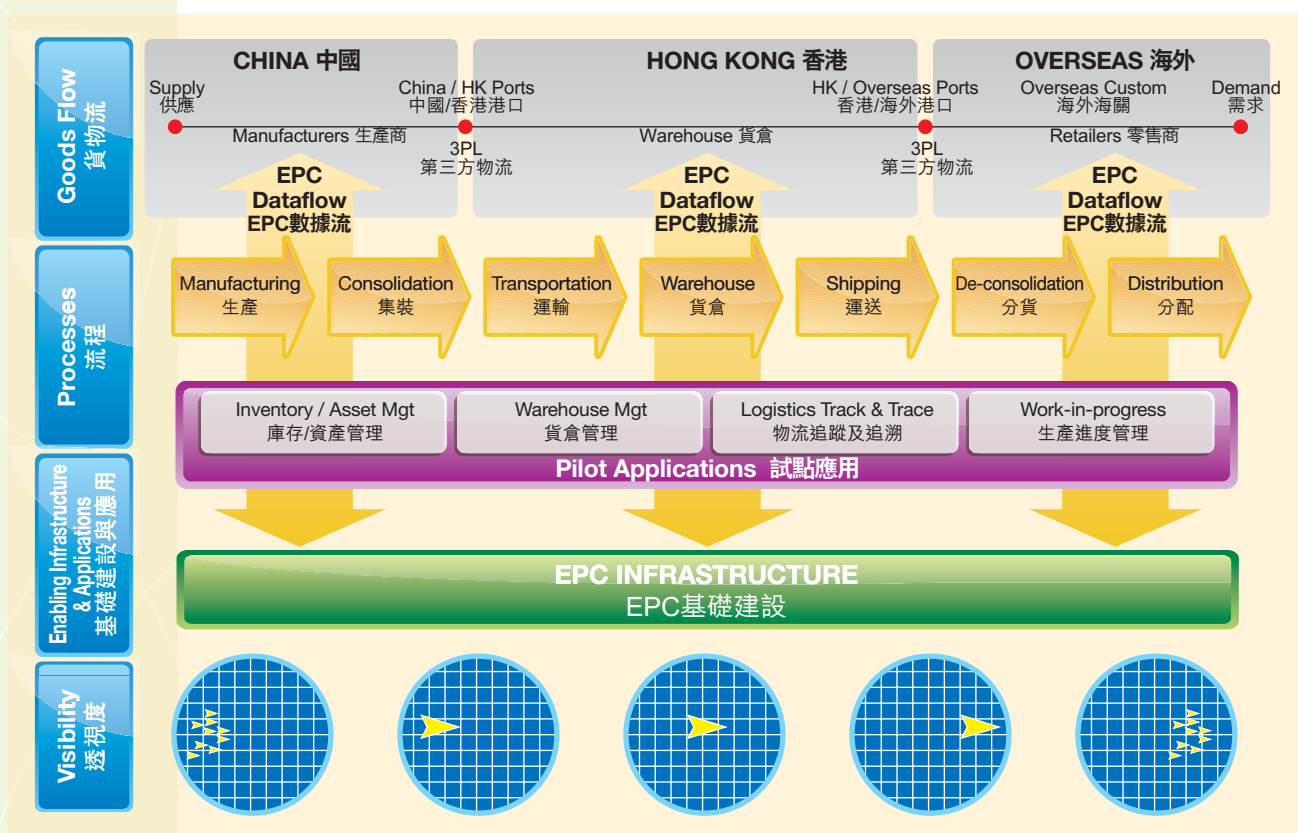
[1] 泛珠三角地區是南中國重要的區域，當中包括香港特別行政區，中國內地9個省份 - 福建、江西、湖南、廣東、廣西、四川、海南、貴州、雲南以及澳門特別行政區

1.3 Global EPC Network Infrastructure

EPCglobal Inc., the non-profit organization comprised of industry leaders, is leading the global development of EPC standards for achieving the end-to-end supply chain visibility.

GS1 Hong Kong undertook a major foundation project funded by The Government of the Hong Kong Special Administrative Region Innovation and Technology Commission to pioneer the establishment of the standard-based EPC network infrastructure to track and trace the movement of the goods of leading companies in China, Hong Kong and United States on a real time basis. The pilots cover not just the inventory movement within a single company but also including major trade routes from products manufactured in PPRD of China, transported via Hong Kong port, to overseas buyers.

The diagram here depicts how this EPC network infrastructure established by GS1 Hong Kong could further realize the potentials of PPRD and Hong Kong in the context of global supply chain integration.

1.3 環球產品電子代碼網絡基建

EPCglobal Inc., 為一包括不同業界領袖的非牟利機構，領導環球EPC標準的發展，成就點對點供應鏈透明化。

香港貨品編碼協會肩負起一個重要的點對點供應鏈透明化項目。這項目由香港特別行政區政府創新科技署資助，率先建構一個以標準為本的產品電子代碼網絡（下稱EPC網絡）實時追蹤及追溯於中國、香港及美國試點公司的物品流向。試點計劃不單覆蓋單一公司內的庫存流向，並包括於中國泛珠三角地區生產的產品經香港港口出口至海外買家的主要路徑。

下圖描述由香港貨品編碼協會建構的EPC網絡如何進一步實現整合泛珠三角地區、香港與環球供應鏈的潛力。

Goods Flow 貨物流

CHINA 中國	HONG KONG 香港	OVERSEAS 海外
Supply 供應		Demand 需求
China / HK Ports 中國/香港港口	HK / Overseas Ports 香港/海外港口	Overseas Custom 海外海關
Manufacturers 生產商	Warehouse 貨倉	Retailers 零售商
3PL 第三方物流	3PL 第三方物流	

EPC Dataflow EPC數據流

Processes 流程

Manufacturing 生產 → Consolidation 集裝 → Transportation 運輸 → Warehouse 貨倉 → Shipping 運送 → De-consolidation 分貨 → Distribution 分配

Enabling Infrastructure & Applications 基礎建設與應用

Inventory / Asset Mgt 庫存/資產管理	Warehouse Mgt 貨倉管理	Logistics Track & Trace 物流追蹤及追溯	Work-in-progress 生產進度管理

Pilot Applications 試點應用

EPC INFRASTRUCTURE
EPC基礎建設

Visibility 透視度

Technically, the overall EPC infrastructure includes:
- EPC-compliant RFID tags, readers
- A XML based language to describe the physical objects (such as a carton of digital cameras manufactured in China, being shipped via Hong Kong port to a retailer in United States) and their attributes (such as the purchase order number of the retailer who ordered the products, the globally unique number to identify that particular carton of camera)
- Software and applications to capture, filter, transform, aggregate, and analyze the RFID/EPC data collected

在技術層面上，EPC網絡基礎包括：
- 合符EPC標準的標籤、閱讀器
- 以XML為本的語言來描述實體物件(如一裝箱由中國生產的數碼相機，經香港港口付運至美國零售商) 及其屬性(如零售商的訂單編號，識別個別裝箱數碼相機全球獨一無二的編碼)。
- 利用軟件及應用程式來擷取、過濾、轉換、結集及分析收集到EPC/ RFID的數據

案例分享

1.4 Ultra High Frequency (UHF) Gen 2 RFID Tags and Readers

For achieving the end-to-end supply chain visibility, one major enabling technology is RFID (Radio Frequency Identification). RFID, compared with traditional barcode technology, has the distinct capability of scanning multiple items at the same time in a very automatic manner.

To apply RFID in the supply chain environment, enterprises need low-priced RFID tags with reading distance of more than 3 meters, that could be reused in the whole supply chain, meaning that the same tag could be scanned by different RFID readers installed at different supply chain companies (retailers, logistics providers, manufacturers) located in different countries with different spectrum allocations by different governments.

Meeting these requirements is a big challenge for the supply chain companies, as it requires not just the technology but also the standards that can work on a global scale. EPCglobal Inc., has been collaboratively developing related EPC standards such as the UHF (ultra high frequency) Gen 2 royalty-free global standard with industry users and technology providers to meeting this challenge.

In the supply chain visibility project managed by GS1 Hong Kong, all the 4 pilot projects were also applying the latest Gen 2 RFID tags and readers available in the market to test out the technology, the standards, and the "supply chain visibility" concept in real business environment.

1.4 超高頻第二代標籤和閱讀器

為達至點對點供應鏈透明化,無線射頻識別技術 (RFID) 是一項重要的技術,相比傳統的條碼技術,它具備同時自動化地掃描眾多貨品的獨特性。

於供應鏈環境中應用RFID,企業需要廉價、具有超過3米閱讀能力、且要能在整條供應鏈上再用的標籤;意思指同一張標籤能被裝置於不同國家、不同頻譜、不同公司(零售商、物流供應商、生產商)的不同閱讀器閱讀。

要供應鏈上的公司達到這些要求是一大挑戰,因為它所需的不單是技術本身的能力,也是一個能於全球層面上應用的標準。EPCglobal Inc. 與不同的業界用戶和技術供應商協作開發相關的EPC標準,例如不含版稅的UHF(超高頻)Gen2(第二代) 全球標準來應付這挑戰。

於香港貨品編碼協會管理的供應鏈透明化的項目中,4個試點計劃都應用於市場上最新Gen2 RFID標籤及閱讀器來測試RFID技術、EPC標準及於真實的商業環境內「供應鏈透明化」的概念。

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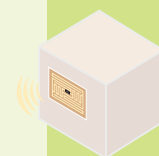
1.5 RFID Industry

Although the RFID technology has been around for several decades, its real potential for widespread use was not fully realized, partially due to a lack of sufficient standardizations, a lack of skilled personnel, and relatively high costs.

The EPC / RFID standards originally developed by the Auto-ID Center at the Massachusetts Institute of Technology and is now overseen by EPCglobal Inc to further develop standards to address business needs and to drive adoption. As the number of industry users keeps growing, the critical mass will further reducing the cost of EPC compliant hardware and software products as well as the cost for deploying EPC / RFID technology.

1.5 無線射頻識別技術行業

雖然RFID技術已存在幾十年，它被廣泛應用的真正潛力並未全面體現，部份歸咎於缺乏足夠標準、技術人員、以及成本相對較高。

EPC / RFID標準本由麻省理工學院的Auto-ID 實驗室開發，現由EPCglobal Inc. 監督繼續開發標準來回應商業需求及推動採納。由於業界用戶不斷增加，這個重要的群體勢將符合EPC標準的硬件和軟件與及施行EPC/RFID技術的成本降低。
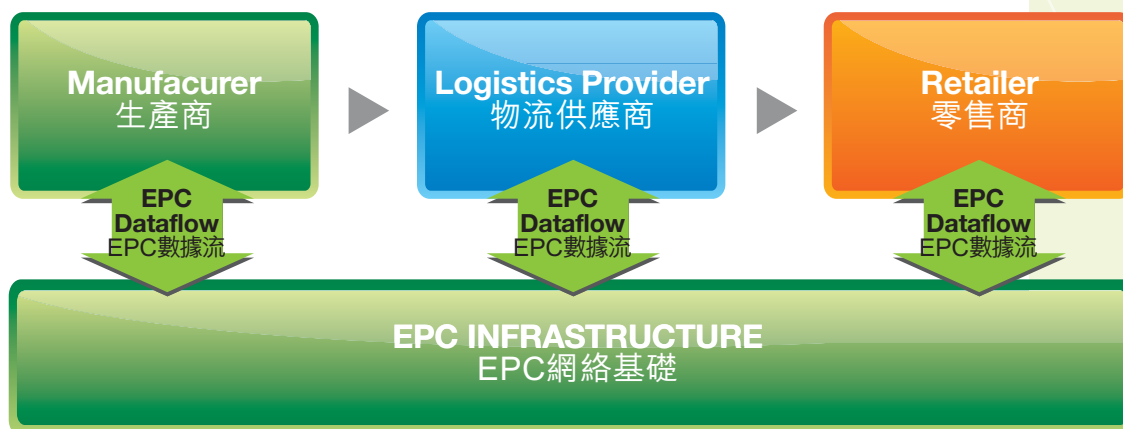
Introduction of the Pilots
試點計劃介紹

2.1 Participants and their Roles in Supply Chain

Below is a simplified model of supply chain and companies may perform as any one of the roles, retailer, logistics provider, and manufacturer. A company may play more than one role in the real-life supply chain.

2.1 參予公司與其供應鏈的角色

下面是一簡化的供應鏈模式，公司可能扮演當中任何一個角色、零售商、物流供應商、生產商。在真實的供應鏈中，公司亦有可能扮演多個角色。

Manufacurer 生產商	Logistics Provider 物流供應商	Retailer 零售商
EPC Dataflow EPC數據流	EPC Dataflow EPC數據流	EPC Dataflow EPC數據流

EPC INFRASTRUCTURE
EPC網絡基礎

2.2 General Objectives and Approach

The main purpose of the 4 pilots was to demonstrate the benefits of supply chain visibility by implementing the EPC / RFID standards and technology regardless what roles pilot companies are performing in global supply chain. Specific pilot project objectives can be found in the coming sections.

A structured approach was followed to ensure that the scope of the pilot was properly defined with all participants including:
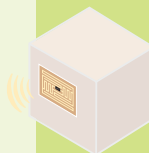
- Pilot companies
  They are the manufacturer, logistics provider, or retailer; with their business processes become EPC/RFID enabled and making use of the EPC data in common EPC infrastructure

- System integrators
  They are companies providing the services like installing the EPC-compliant RFID readers in the pilot companies, integrating the readers and related software and data at the pilot companies with the common EPC infrastructure

- GS1 Hong Kong
  It established the EPC infrastructure, providing the integration guidelines and training to the system integrators to integrate with the infrastructure, and managing the implementation of the 4 pilot projects.
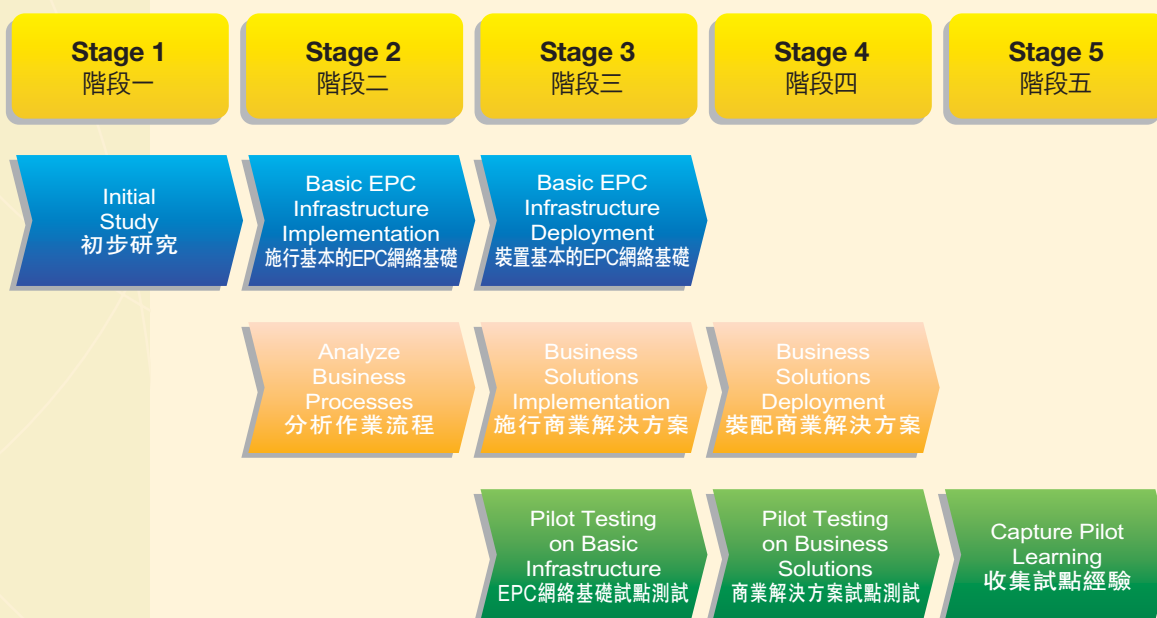
2.2 目標與模式

本項目的4個試點計劃目標是透過施行EPC / RFID標準及技術來向不同供應鏈的夥伴展示供應鏈透明化的優點。個別試點計劃的目標會於接下來的部份描述。

為確保試點計劃的範疇能確定下來，所有參予計劃的公司就需要跟隨一個有系統的模式，當中包括：

- 試點計劃公司
  它們包括零售商、物流供應商、生產商；其生產流程將具備EPC / RFID的元素，並使用於共用的EPC網絡基礎上的EPC數據。

- 系統整合供應商
  它們包括提供如於試點計劃公司安裝符合EPC標準的RFID閱讀器、整合EPC網絡基礎與閱讀器、相關軟件及數據服務的公司。

- 香港貨品編碼協會
  香港貨品編碼協會建構EPC網絡基礎，提供整合指引、向系統整合供應商提供整合EPC網絡基礎培訓服務，以及管理4個試點計劃的施行。

Pilot Approach 試點模式

Stage 1 階段一	Stage 2 階段二	Stage 3 階段三	Stage 4 階段四	Stage 5 階段五

| Initial Study 初步研究 | Basic EPC Infrastructure Implementation 施行基本的EPC網絡基礎 | Basic EPC Infrastructure Deployment 裝置基本的EPC網絡基礎 | | |

| | Analyze Business Processes 分析作業流程 | Business Solutions Implementation 施行商業解決方案 | Business Solutions Deployment 裝配商業解決方案 | |

| | | Pilot Testing on Basic Infrastructure EPC網絡基礎試點測試 | Pilot Testing on Business Solutions 商業解決方案試點測試 | Capture Pilot Learning 收集試點經驗 |

Stage 1

Due to the system complexity and the novel nature of EPC technologies, prototyping approach is used to study and implement the EPC standards and technologies. During the initial study, a prototype of the EPC network infrastructure is built to understand how the whole suite of EPC standards and technologies work together.

Stage 2

After a prototype of EPC network infrastructure is completed, the GS1 Hong Kong project team fine-tuned the system design and implemented it. The project team also analyzes the existing ("as is") business processes of the pilot companies, working with system integrators and pilot companies to define the pilot scope including the "to be" EPC-enabled business processes.

Stage 3

After implementing the EPC network infrastructure, GS1 Hong Kong project team deployed the EPC network infrastructure for the pilot companies to pilot run. Based on the "to be" EPC-enabled business processes, the project team designed and implemented appropriate business solutions running on the EPC network infrastructure for different pilot companies.

Stage 4

The GS1 Hong Kong project team deployed the business solutions running on the EPC infrastructure for pilot companies to trial run.

Stage 5

The GS1 Hong Kong project team captured the key learning from the pilot testing.

階段一

鑑於系統的複雜性和EPC技術的新穎特質,香港貨品編碼協會的項目團隊採用了原型的方式來研究及施行EPC網絡基礎。在初步研究階段,團隊建構了一個EPC網絡基礎原型來了解整套EPC標準和技術如何整合運作。

階段二

當EPC網絡基礎原型建設完成後,團隊優化了系統的設計並施行。團隊亦分析了各試點公司「現時」的作業流程,與系統整合商和試點公司共同制定試點計劃的範疇,包括「未來」具備EPC的作業流程。

階段三

施行了EPC網絡基礎後,團隊於各試點公司裝置EPC網絡基礎進行測試。同時,團隊亦按各公司已制定具備EPC的作業流程設計和施行適合於EPC網絡基礎上運作的商業解決方案。

階段四

香港貨品編碼協會的項目團隊為各試點公司裝置於EPC網絡上運作的商業解決方案,並進行測試。

階段五

香港貨品編碼協會的項目團隊收集試點經驗。

Conclusion 總結

Through implementing the pilot projects, GS1 Hong Kong have successfully gained substantial real- life implementation experiences in the new Electronic Product Code standards and technologies, by establishing an EPC Network Infrastructure to enable end-to-end supply chain visibility for trading partners.

GS1 Hong Kong can conclude the project with the followings:

i. EPC Standards Integration

In the four pilots, EPCglobal standards from hardware tags, Gen 2 air protocol and, hardware readers, to RFID middleware and an EPC network, were fully integrated with different GS1 global numbering standards such aslike GLN, GTIN, GRAI and SSCC.

ii. EPC UHF Read Rate

In the 4four pilots, different tagging methods are were used to tag the product at pallet and carton level. In different environments, GS1 Hong Kong has learnt and gained experiences in achieving the highest read rate by optimum setting in:

- The type/composition of products
- Eliminating physical environment interference
- Antenna distance and power
- Antenna angle
- Carton and RFID tag orientation
- Operation motion and sequencing during palletizationpalletisation

iii. EPC Standard Inter-operability

Different solution integrators are were selected and different brands of EPC compliant RFID equipment wais used, including middleware, RFID printers, fixed RFID readers, mobile RFID readers, RFID tags, and EPCIS. All of these hardware and software are all EPCglobal standard compliant and working well with each other, proving that the standard compliant products are inter-operable, giving the end users options to choose from.

透過實行這些試點計劃,香港貨品編碼協會成功給貿易夥伴建立EPC網絡基建來成就點對點供應鏈透明化,並成功獲得關於新EPC標準和技術執行上的寶貴而真實經驗。

香港貨品編碼協會總結計劃成果如下:

i. EPC標準整合

在四個試點項目裏,由EPCglobal標籤標準、第二代通訊協定、閱讀器、硬件、RFID中介軟件到EPC網絡,均完全與不同的GS1環球編碼標準例如國際位置編碼、國際貿易貨品編碼、全球可回收資產識別碼和貨運容器序號等整合。

ii. EPC超高頻閱讀速率

在四個試點項目裏,不同標籤方法被應用來標籤在托盤層面和貨箱層面的產品。在不同環境中,香港貨品編碼協會獲得如何佈置來達至最高閱讀速率的經驗,這些佈置包括:

- 產品種類和組成
- 減少實際環境干擾
- 天線距離和能量
- 天線角度
- 貨箱和RFID標籤的方向
- 操作動作和集成托盤時的次序

iii. EPC標準互相操作能力

我們挑了不同解決方案整合者,亦使用了不同品牌、符合EPC標準的RFID儀器,包括中介軟件、RFID打列機、固定RFID閱讀器、手提式RFID閱讀器、RFID標籤和EPC訊息服務。所有硬件和軟件均符合EPCglobal標準,並能互相協調使用,證明符合標準產品的相互操作能力,讓用戶有更多選擇。

The Promises of the EPC Network Infrastructure
Connecting Hong Kong and the Pan- Pearl River Delta Region to the Worlds Marketplaces

EPC網絡基建的承諾
聯繫香港與泛珠三角區域 邁向世界市場

Riding on the existing Internet infrastructure and with the support from the Innovation and Technology Commission, the Hong Kong EPCnetwork infrastructure initiatives saves a substantial amount of investment time and money for early adopters implementing EPC / RFID. On the one hand, the easily "Plug and Play" Hong Kong EPCnetwork infrastructure enables enterprises to enjoy many of the business benefits EPC and the EPCnetwork promises to deliver by gathering real- time information to streamline business processes, track and trace the logistics of the semi and finished goods, and make better business decisions without worrying too much about building and investing in the technical infrastructure. On the other hand, the network also strengthens the overall competitiveness of the region and individual enterprises in the global environment by reinforcing business relationships with the customers through adopting the global supply chain standard.

靠著現有的互聯網基建和創新科技署的支持,香港EPC網絡基建,為實行EPC / RFID的先驅節省了許多寶貴時間和資金。另一方面,香港EPC網絡基建簡單的「即裝即用」模式,亦令企業領略到EPC的商業優勢和EPC網絡的承諾,包括收集實時資訊來優化作業流程,追蹤和追溯成品和半成品的物流,減低建立和投資於技術基礎的煩惱,從而能夠作出更好的業務決定。此外,透過採納全球供應鏈標準,鞏固與客戶的關係,EPC網絡亦有助整個地區和個別企業透過於全球市場上強化其整體的競爭力。

It is time to act now to join the global EPC / RFID forces and be the winning champions in the globalworld's marketplace.

現在就行動,加入EPC / RFID 的隊伍,成為環球市場的優勝者。
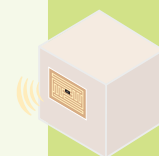
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