



Lien Foundation changes the face of Singapore's nursing homes with bold IT initiative

IT transformation to increase productivity, improve capacity and raise quality of care for seven nursing homes

Singapore, 26 Mar 2013.

1. The **Lien Foundation** announced its healthcare information technology (IT) initiative called **IngoT II**¹ for seven voluntary welfare organisations (VWO) nursing homes today. IngoT II is a universally designed nursing home IT system hosted on cloud that comes with a mobility solution for doctors and nurses. When completed, the S\$2m project will boost eldercare for one in five nursing beds in Singapore.

Revving up productivity to meet rising demand

2. "Nursing homes today face intense demands for their services in an environment of capacity constraint and manpower crunch," said Mr. Lee Poh Wah, CEO, Lien Foundation. "Structural reforms and productivity growth are needed to meet escalating demands and increasing expectations for quality care. IngoT II is a ground-up IT initiative, designed with scale and best practices in mind, to help nursing homes improve productivity, safety, communication and coordination across care teams."

Cloud computing power

3. IngoT II is an enhancement of the Foundation's successful "IngoT" project launched in 2007. This first initiative provided ten healthcare NGOs with an Enterprise Resource Planning (ERP) system that enhanced productivity, patient care and corporate governance. The Foundation has now brought that experience into the nursing homes sector by empowering a group of seven

¹ "IngoT" stands for "IT stretching the capability, potential and imagination of NGOs (non-government organizations)".

nursing homes with cloud computing power and mobility solutions through IngoT II.

The IngoT II consortium comprises:

- a. Peacehaven Nursing Home
 - b. Peacehaven Bedok Multi-Service Centre
 - c. Man Fut Tong Nursing Home
 - d. Ling Kwang Home for Senior Citizens
 - e. Kwong Wai Shiu Hospital
 - f. Ren Ci Nursing Home
 - g. St Joseph's Home
4. IngoT II's collective power on cloud and consolidated resources enables the group to enjoy lower cost of IT ownership and maintenance as well as better connectivity with their respective partners and health agencies. To date, the project's solution architect and developer, PulseSync Pte Ltd ("PulseSync") has successfully rolled out IngoT II for Peacehaven Nursing Home and Peacehaven Bedok Multi-Service Centre. IngoT II will be fully implemented in Man Fut Tong Nursing Home by April this year and rolled out in the rest of the consortium by first quarter 2014. (Schedule in Annex)

IT transformation bring benefits to early adopters

5. Reaping the first fruits of IngoT II are The Salvation Army's Peacehaven Nursing Home, an early adopter of IngoT since July 2011, and Peacehaven Bedok Multi-Service Centre. "Nursing homes are traditionally bogged down by paper-heavy and manual processes," said Mdm Low Mui Lang, Executive Director of Peacehaven Nursing Home. "IngoT II has enabled Peacehaven to save at least 10% of our manpower needs by streamlining work flows and enhancing present capabilities." She noted how the new IT system has improved processes of care and resident outcomes by adding, "Now our nurses are freed up from many of such tasks, allowing them to better focus on residents and giving valuable person-centred care."

Removing roadblocks

6. Today, Peacehaven has greater control and insight into their operations as IT is used to unlock bottlenecks and productivity roadblocks. Mr. Ken Tan, Managing Director, PulseSync said, "We tailored the IT system according to Peacehaven's

needs. To scope the project requirements, we conducted many ‘blue-sky’ thinking sessions with management and staff. Some of the key priority areas that emerged were residents’ care and safety, data accuracy and reporting, as well as communication between staff, residents and their families.” Special attention was also given to create a system that not only supported clinical decision-making; it also promoted data standards, and let different systems communicate with each other.

Increased productivity and savings in time

7. Greater uses of information technologies contribute to productivity by enabling more efficient data capture, storage and shared access. One of the most-telling benefits experienced in Peacehaven was the drastic reduction of paperwork and files. Over 100 paper forms and reports that had to be filled in and managed by administrators, doctors, nurses, therapists, allied health workers, social workers and pastoral care staff are now streamlined in an electronic system hosted on a secure cloud.

8. Recording clinical assessments and other data digitally into the new BMWs (Bedside Mobile Workstations) in each ward facilitates clear and concise communication between staff. Nurses and doctors are able to view records easily and handover cases clearly. It also greatly reduced the time and resources needed to transcribe, manage and store the paper information. “It’s so much easier to get information now,” said Peacehaven’s Nurse Winifreda Macatangay. “At a glance, I can see a patient’s records, medical history, family details and doctors’ notes and social workers’ observations. The information is also constantly kept up-to-date electronically.”

Health Caregivers Empowered by IT

Nurse Winifreda Macatangay at Peacehaven Nursing Home by The Salvation Army relates how the staff is now empowered to give better care to the residents. “Medical instructions are no longer hand-written, so we don’t have to spend extra time deciphering doctors’ notes and can act on them quickly. We also key in our observations or incident reports directly into the system. The system then alerts the relevant staff to follow up. For example, our physiotherapist can now access all residents’ information online and make an immediate evaluation without having to visit the ward to access the report. We are also able to make preparations to receive new residents in advance, as all referral details from AIC are online, ensuring a smoother transition for our residents.”

Mobility solution to empower staff

9. As a result of IngoT II, the medical staff in Peacehaven is equipped with tablets for immediate recording of observations and easy access to all residents' records at the click of a button. By hosting the medical records on cloud, the system now allows the nursing director and doctors to even conduct diagnosis or access patient data through remote access. Mdm Low observed, "With swifter and more accurate analysis of the residents' health, IngoT II has empowered our staff to make quicker and more objective decisions and raised the overall quality of care for residents."

Enhanced infection control and patient safety

10. The daily update and consolidation of all (residents') information on the IngoT II system has led to better monitoring and care with timely analytics and reports. For example, the risks of potential infections within a ward are now quickly flagged out for attention and action through the computers' oversight of each resident's temperature and physical condition. Previously, nurses had to check each ward's white board manually in order to spot any cluster of infection. In the area of drug dispensing, patient safety has improved as the system now provides an audit trail for each prescription - from the time it is dispensed, to when it is consumed and re-ordered.

Upsurge in capacity and agility

11. In November 2011, Peacehaven launched a new 32-bed service called the Transitional Convalescent Facility (TCF) for patients to transit from hospitals to homes through rehabilitation and care. In less than a day, the IT system for this facility was set up and ready to receive its first patient. This was only possible due to the strong foundation of systems and processes built by IngoT II.

Forging path for wider adoption

12. Mr Lee said, "Peacehaven's success shows how IT innovation can make significant productivity gains for nursing homes struggling to optimise resources. We hope this would encourage greater IT investment in the eldercare sector. Reviewing current policies to incentivise such efforts can help transform the future of eldercare for a fast greying Singapore."

Annex

- a. Factsheet on IngoT II
- b. Technology Factsheet on IngoT II
- c. IngoT II Infographic

About the Lien Foundation

www.lienfoundation.org

The Lien Foundation is a Singapore philanthropic house noted for its model of radical philanthropy. It breaks new ground by investing in innovative solutions, convening strategic partnerships and catalysing action on social and environmental challenges. The Foundation seeks to foster exemplary early childhood education, excellence in eldercare and effective environmental sustainability in water and sanitation.

The Foundation supports innovative models of eldercare while advocating greater attention on dementia care and better care for the dying. Since 2005, the Foundation has harnessed IT for capacity building and enhanced the quality of care in healthcare nonprofits like hospices and nursing homes. In 2010, the Foundation commissioned the first-ever global Quality of Death index ranking 40 countries on their provision of end-of-life care. It has also published research that revealed the views and perspectives of doctors and thought leaders on what would improve end-of-life care in Singapore.

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IngoT II Factsheet

IT stretching the capability, potential and imagination of NGOs

Singapore is one of the fastest ageing societies in Asia. One in five residents are expected to be 65 years and older by the year 2030.

IngoT II is an integrated healthcare IT system conceived and implemented by Lien Foundation and PulseSync to boost the capacity and quality of care for seven Voluntary Welfare Organisation nursing homes in Singapore.

IngoT II has been successfully rolled out in Peacehaven Nursing Home by The Salvation Army and all seven participating nursing homes will be on the IngoT cloud by first quarter 2014.

What is IngoT II?

IngoT II is an end-to-end nursing home web-based system that leverages on powerful Microsoft technologies. It taps on the power of secure cloud computing and empowers the staff with mobile technologies like the Bedside Mobile Workstations (BMW) and tablets. It includes modules to efficiently manage operational processes, to help improve the quality of care and improve controls and governance.

The IngoT II Consortium

- a. Peacehaven Nursing Home
- b. Peacehaven Bedok Multi-Service Centre
- c. Man Fut Tong Nursing Home
- d. Ling Kwang Home for Senior Citizens
- e. Kwong Wai Shiu Hospital
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IngoT II Facts & Figures

Number of nursing homes	7
Number of patients/nursing beds in the IngoT consortium	1,824 as at Mar 2013* 2,289 by 2015
Amount of investment by Lien Foundation <i>- Each nursing home benefits from the one-to-one dollar matching provided by the Community Silver Trust fund administered by the AIC</i>	\$2m
Total cost of project (including Lien Foundation funding)	\$2.65m
Duration of project	24 months Starting early 2012

* Based on the number of nursing home beds in Mar 2013, IngoT II is expected to boost eldercare for one in five nursing beds in Singapore upon completion.

Peacehaven Nursing Home

Number of forms that have gone paperless	100
Number of reports compiled / generated automatically	40
Number of BMWs (Bedside Mobile Workstations)	13
Number of mobile devices	30 iPads
Estimated number of staff who benefit directly from IngoT II	200
Estimated impact on productivity	Saved at least 10% of manpower needs

IngoT II Consortium

	Bed Capacity (2013)	Bed Capacity (Q1 2015)	Service Type	IngoT Cloud Target Deployment Date
Peacehaven Nursing Home	401	401	Long Stay, Respite Care, Transitional Convalescent Facility	Jan 2013 - Completed
Bedok Multiservice Centre	90	90	SPICE, Day Rehab Centre, Dementia Day Care	Jul 2012 - Completed
Man Fut Tong Nursing Home	232	232	Long Stay, Respite, Day Rehab, Day Care Centre	Apr 2013
Ling Kwang Home for Senior Citizens	350	*350	Long Stay, Respite, SPICE and Day Rehab	July 2013
Kwong Wai Shiu Hospital	400	600	Long Stay, Respite, Day Rehab	Oct 2013
Renci Nursing Home (Moulmein)	212	212	Long Stay, Respite Care	Oct 2013
Renci Nursing Home (Bukit Batok)	0	265	Long Stay, Respite Care	Q4 2014
St Joseph's Home	139	*139	Long Stay, Respite, Hospice	Q1 2014
Total	1,824	2,289		

Key Features of IngoT II

- **Referral, Discharge, Transfer and Admission (RADT)** to manage referrals from AIC and other referral sources, process admission and discharge, and handle and maintain other episodic information
- **Electronic Medical Record (EMR)** to capture and maintain resident centric medical information such as medical background, history, allergy, diagnosis, investigation
- **Ward Management** to help nurses and workers better monitor and manage resident at each ward. It includes an innovative ward board, a graphic presentation of each resident status, vital sign and current location.
- **Nursing** to allow the recording and managing of daily progress, record, devise and track personalized care plans, and performing routine and ad-hoc nursing assessments such as RAF, Braden Scale, Modified Barthel Index, Instrumental Activities of Daily Living, etc.
- **Medical** to allow doctors to update and view SOAP-based (Subjective-Objective-Assessment-Plan) progress notes and follow-up
- **Allied Health** to allow physiotherapists, occupational therapists and other allied health workers to manage intakes, do assessments, create and manage their care plans.
- **Social Work and Pastoral Care** to assist social workers and pastoral staff to capture and manage confidential and shared notes, perform assessment and do follow-up
- **Inpatient Medication Record (IMR)** to enable doctors to prescribe and manage drug orders
- **Medication Administration Record (MAR)** to facilitate the administration of drugs
- **Transport Management** to manage and fulfil transport requests, assign and schedule transport personnel and vehicles
- **Reports and Analytics** to provide aggregated clinical data/ reports, statistical and management reports
- **Interfaces** to allow secured exchange/ transmission of information with internal and external systems owned by other stakeholders such as AIC and MOH

Key Benefits from IngoT II

- 1. Significant time savings and increased labour efficiency**
 - Eliminated redundant, costly and inefficient manual paper-based processes and case files by replacing them with streamlined and automated electronic processes integrated to flow seamlessly between different users and business units.
 - e.g. Real time incident reports, nursing care plans, doctors' reports & requests

Time Savings:

 - *5 hours a month per resident on updating nursing care plan*
 - *At least 1.5 hours each day in handover report time by nurses during shift changes*

- 2. Cost containment**
 - Kept operational costs constant, despite Peacehaven's growth to 401 beds (from 395) and starting new transitional convalescent care service.

Time Savings:

 - *Four weeks of manual data entry of drugs, diapers and medical supplies redeployed to auditing function in Accounts department. Took away the need for one new headcount.*

- 3. Improved care delivery and co-ordination**
 - The savings in time has freed care team members to give more quality and face time with residents.
 - Electronic shared records give care team members ready and quick access to resident's information for decisions on care (e.g. intervention, care plan, treatment, etc.)
 - Improved access to resident's information and common Communication Book enhances the care coordination and collaboration among care team members, promoting greater cross discipline teamwork and synergy.

Time Savings:

 - *Admission time per case reduced from 1-2 days to half a day.*
 - *Same-day response to relatives' enquiries, previously could take up to 2 days*

- 4. Better control and governance**
 - Management team can access to residents' records any time, anywhere
 - Data analytics and reports have improved monitoring and ability to spot problem areas (e.g. bed census, infection control, incident reports, etc.)
 - Internal controls and security measures provide checks and prevent abuse with clear audit trails.
 - Online ward board gives real-time status of residents' vital signs and surveillance list at a glance.

Time Savings:

- *5.5 hours per day during epidemic period without the need to record and identify fever cluster manually*

5. Improved agility

- Using IngoT II as a foundation for its operations, Peacehaven was able to set up its new Transitional Convalescent Facility within 24 hours.
- System able to provide useful data for research purposes for National Care Assessment Framework to uplift service levels

Record breaking:

- *Clinical and administrative data set up within 24 hours*

In conclusion

Residents in Peacehaven are able to have better quality time for care and rehabilitation as a result of improved efficiencies, productivity and access to shared information enjoyed by the care team.

IngoT II has given Peacehaven a platform for monitoring, management and control of their operations. This has helped Peacehaven to improve corporate governance and drive greater accountability at various levels. With better analytics and reports, Peacehaven can identify trends and areas in which they can improve or provide value added services for the residents, allowing for better planning.

With IngoT II, Peacehaven is now better equipped to keep up with the dynamics of business changes driven by needs of greying population and concerned regulators. It is poised for future growth with its new agility to adapt to increased demands.

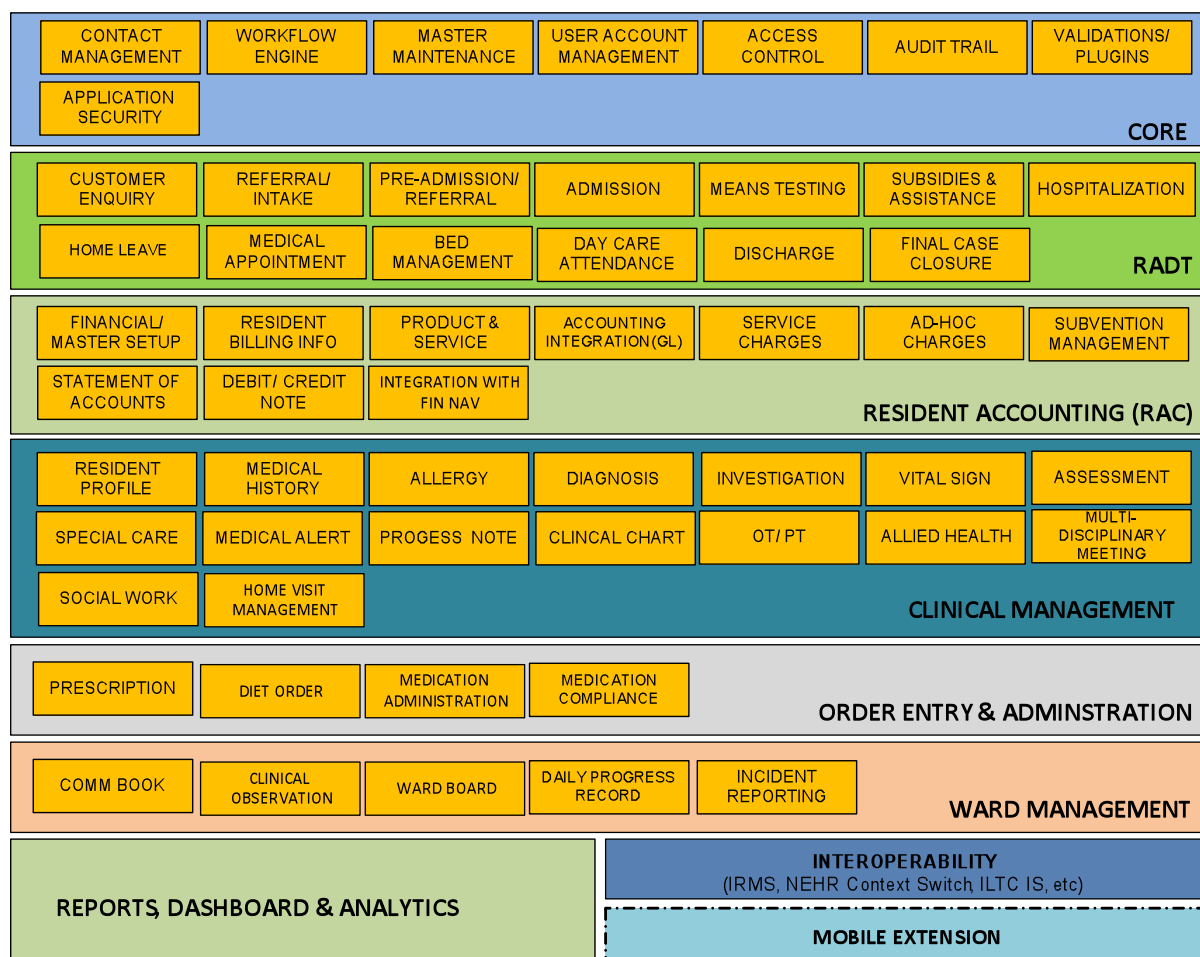
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IngoT II – Technology Overview

IngoT II is a revolutionary cloud based nursing home application running on software-as-a-service (SaaS) model. It leverages on various Microsoft technologies inclusively the MS Dynamics CRM, MS SQL, Silverlight and .NET. This is the first of its kind cloud service in Singapore and 7 VWO Nursing Homes have already signed up and more are following suit.

Below are the various functionalities of IngoT2 covering broadly the following areas:

1. Core
2. RADT (Referral, Admission, Discharge & Transfer)
3. Resident Accounting/ Billing
4. Clinical Management
5. Order Entry & Administration (including Medication Administration Record)
6. Reports, Dashboard & Analytics
7. Interoperability (Interfaces and Integration)
8. Mobile Extension (Currently only Mobile Medication Administration Record apps is available for APPLE iPad)



IngoT II Technology

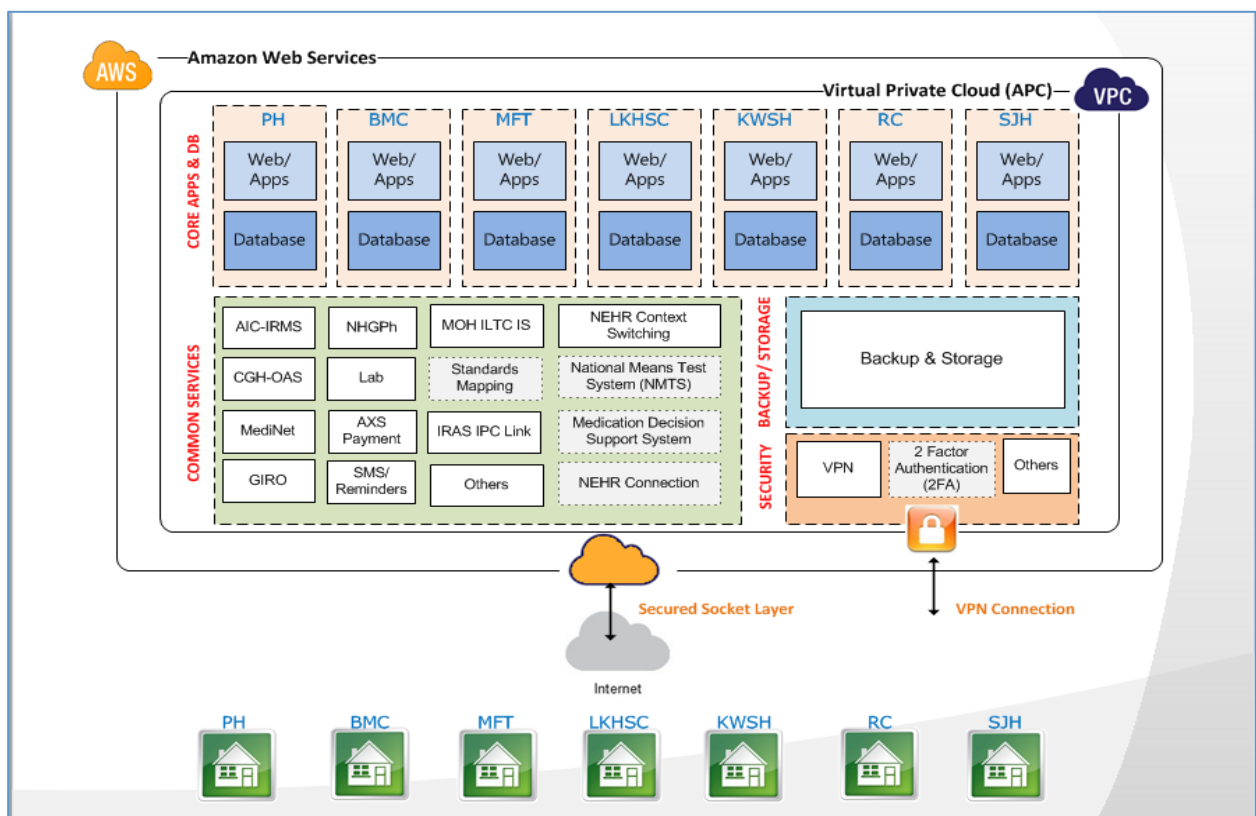
IngoT2 technology foci are primary Cloud Computing, Mobility and Connectivity, helping Nursing Homes to meet their business goals. Its foundation is based on Enterprise Architecture to achieve Security, Stability (Reliability), Speed (Performance), Sustainable and Scalability

Cloud Computing

IngoT2 is currently Cloud hosted with Amazon Web Services (AWS), an internationally recognized Cloud-hosting Service Company with data centres in Singapore. Running on a highly secured infrastructure and environment which comply with many internationally security standards and best practices such as ISO 27001, HIPAA, Service Organization Control, etc., AWS offers an affordable yet powerful platform for IngoT2.

Besides offering a guaranteed uptime of 99.95% SLA (Service Level Agreement), AWS also comes with a wide range of ready pay-per-use services such as Performance Monitoring, Auto Scaling, Backup & Storage, Load Balancing, etc., making the running of IngoT2 easy, secured, reliable and readily scalable.

For added security and performance, all deployments are within a Virtual Private Cloud environment. For each nursing home, deployment is on a 2-tier architecture with the Apps and Web on one instance and the Database on a separate secured instance. Access to IngoT system shall be via internet enabled notebooks, workstations, computer-on-wheels, tablets and mobile devices. IngoT2 offers both secured accesses via Secured Socket Layers (SSL) and Virtual Private Network (VPN). A daily full backup routine will run at midnight to early morning every day.



Mobility

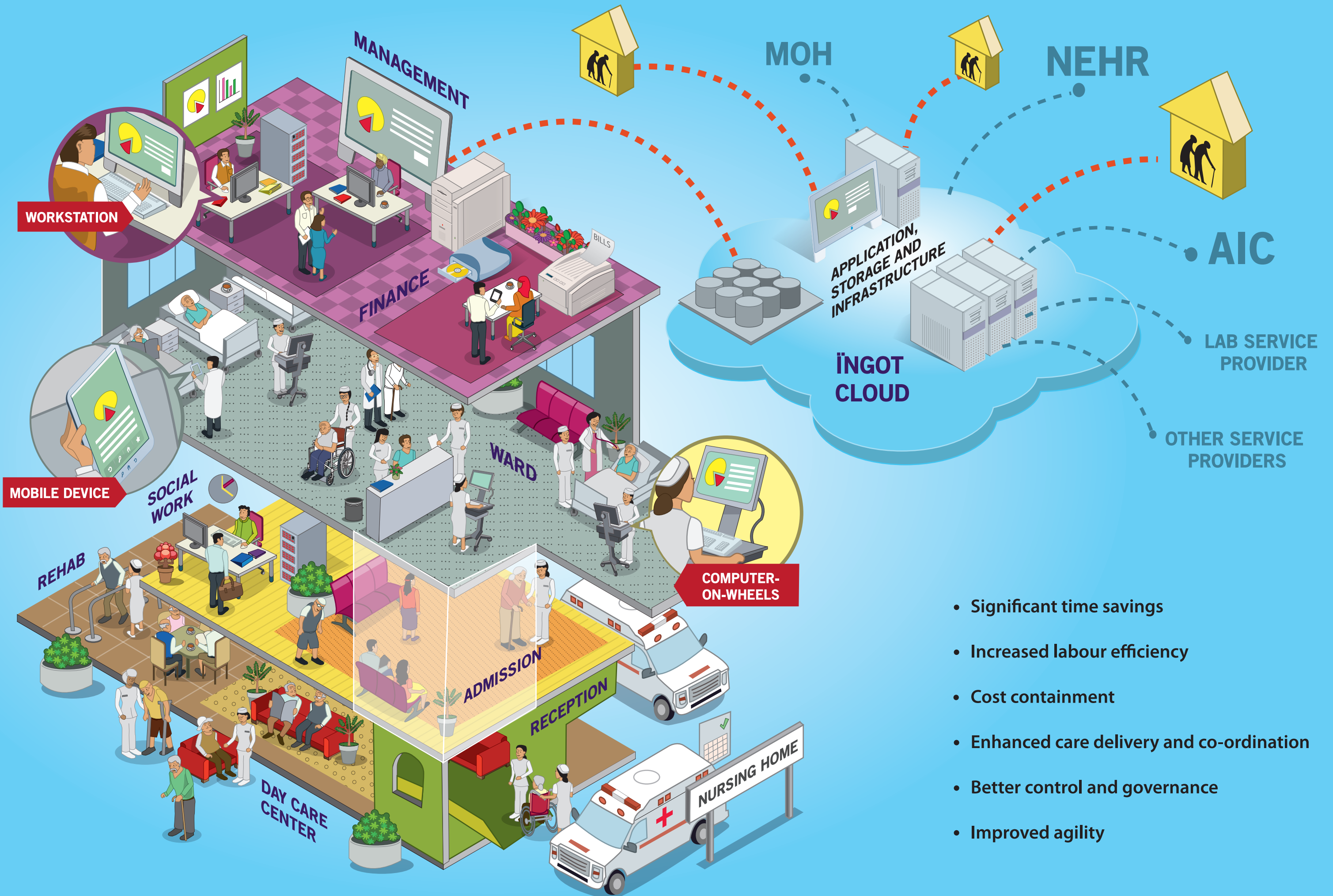
To further improve the accessibility and capturing of information, we have extended IngoT2 to the mobile platform. A Mobile Medication Administration Record (Mobile MAR) application was recently developed to allow nurses to record drug administration on point of medication serving. This will help to reduce medication error as nurses can double check, what scheduled medications to serve and note any special instructions given by doctors, using iPad tablets prior to serving. Besides medication administration, nurses can also use the application to view the medication chart and update vital-signs (such as temperature, pulse rate, respiratory rate, blood pressure, etc.).

Connectivity

IngoT2 strives to adopt open and interoperable standards to allow extensions and “handshakes” with third party and/or external systems of government, hospitals, agencies, service providers and other healthcare providers. This strengthens the partnership and collaboration among healthcare professionals, providers and the healthcare eco-system in general.

The goal is to architecturally provide as many bridges, links and interfaces to close the information gaps between various stakeholders, thus ensuring critical information pertaining to patients will not fall through the cracks along the care continuum.

To date, interfaces with Agency for Integrated Care’s (AIC) referral system, subvention, service providers and many other interfaces have been built. We are expected to roll out context switching with the National Electronic Health Record (NEHR) system, and real-time electronic ordering mechanism with service providers such as Pharmacies, Laboratories, and other such systems/subsystems. The interface/interoperability standards used include XML, HL7 2.xx, secured ftp, etc.



- Significant time savings
- Increased labour efficiency
- Cost containment
- Enhanced care delivery and co-ordination
- Better control and governance
- Improved agility