

# SOFTWARE DEVELOPMENT PROCESSES

## Case Study – Blossom View Retirement Homes

### SUMMARY

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Blossom View Retirement Homes operate a number of retirement homes in which residents live in purpose-built flats with some extra assistance and care available as required. One service offered is the management and delivery of scheduled medication, where a care worker visits with the correct medication when it is time to take it. You, as the head of the company's IT team, will be responsible for delivering an electronic system to allow staff to keep track of which medicines should be delivered to which flats at what time, allowing doctors and pharmacists to adjust medication, timings and instructions as necessary.

### COMPANY INFORMATION

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Blossom View Retirement Homes is a small group of three retirement homes in the Lake District. The company originally started with a single, large, setting near Keswick but in the past five years has expanded significantly by purchasing two smaller homes in Penrith and Grasmere. Each of the three sites, referred to as settings, feature self-contained flats with additional shared facilities designed to allow retirees to easily access additional support while living largely independently. Residents purchase their flat outright while paying a monthly fee for some domestic support e.g. cleaning, laundry, maintenance, meals in the dining room, personal care, management of medication etc. The fees charged vary based on the amount of support required, with residents typically making greater use of the services as they get older. The settings are designated as extra care housing [1], and as such are regulated and inspected by the Quality Care Commission (CQC) to ensure they are operating safely and lawfully.

The Keswick setting comprises 44 flats with a shared lounge and social area, dining room, laundry facilities and gardens. There are a small number of care staff on-site 24/7 who provide general domestic help, manage the emergency call system, and manage residents' medication along with a kitchen staff who prepare lunch and dinner each day, charged on an *ad hoc* basis, popular with residents.

The **Penrith setting** is smaller with **19 flats** alongside a residents' lounge, a laundry service, and extensive gardens. The **Grasmere setting** is the smallest, with **17 flats** and a laundry service. The Penrith and Grasmere settings are **staffed with care staff 8:00am-8:00pm** each day, but there is an **out-of-hours emergency service** for residents if they activate their emergency call which is provided by a subcontractor.

The company's head office is a small rented space near the Keswick setting. The space has offices for the **company's CEO**, and shared offices for small admin, finance, HR & payroll, and **IT teams**, along with a meeting room typically used for internal meetings. Each setting has a management office, while the Keswick setting also has an office for an **assistant manager** and a meeting room. Each of the three settings has a well-sized staff room with one side set up with desks for working, and the other set up as a break room with basic facilities for staff to relax on breaks, make tea/coffee etc. The company is considering the possibility of acquiring finance to build another setting, possibly as large as the Keswick facility, in the region over the next few years but no firm plans are yet in place.

Each setting has a **setting manager**, and a **care work supervisor** in charge of the Morning shift (8:00am-3:00pm), Afternoon shift (1:00pm-8:00pm), and in the case of the Keswick setting Night shift (8:00pm-8:00am). The Keswick setting also has an **assistant manager** because of its size. Most of the **care workers** work 4-5 days a week, with illness and holiday leave covered via voluntary overtime. The company also has a cover agreement with a **local competitor**, where unfilled overtime shifts are offered to staff at the other company and *vice versa*, which normally avoids the need for agency staff. The company employs **59 staff in total** across the three settings and head office, which means that they just-about qualify as a **Medium enterprise (>50 staff)** using the standard definition [2].

## EXISTING IT INFRASTRUCTURE

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Blossom View has a small IT team which you manage. The team is responsible for all of the company's infrastructure and general maintenance, including the Head Office network, the VPN used by setting managers (and the Keswick assistant manager), and the purchasing and maintenance of hardware (office PCs, laptops, printers, copiers etc.). The company uses Office365 heavily, with hosted e-mail, file storage and access control.

The team manages the company's website, which is hosted externally using PHP/MySQL and lists flats available for sale at the settings and allows viewings to be booked as well as providing static information. The booking system e-mails the relevant setting manager the desired booking dates/times/contact details and the manager confirms with the prospective buyer by phone. The team also develops and maintains a custom rota system for the settings, which is written using ASP.NET in C# using a MSSQL database and runs on an internal intranet server – also maintained by the team.

## SCENARIO

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A recent inspection by the **Quality Care Commission** (QCC) raised a concern over the company's management of residents' medication, which is currently handled with a **purely paper-based process**. At present, a resident who chooses to have their medicine brought to them at the correct times asks

their GP and pharmacist to liaise with the on-site care staff when writing a prescription and delivering medication. The GP sends the prescription to a local pharmacist, who delivers the medicine to the staff at the setting, provides instructions on storage, and informs staff when and how the medicine is to be taken. Medication is stored in a lockable fridge or cupboard in the staff room.

Under the supervision of the pharmacist, the setting staff record timing and dosage information on a paper chart named the *medicine round chart*. The medicine round chart is a table of times, flat numbers, medicine names, and dosage/usage instructions. When delivering medication the staff take the chart with them along with the actual medicine to allow them to check that they deliver the correct drugs, in the correct dosage, at the correct time. An example of the format of a medicine round chart is depicted in Table. I, below. Note: the real chart for each setting is much larger, with over 100 doses of medication delivered per day at the Keswick setting.

Table I: Example Medicine Round Chart Format

Time	Flat	No	Medicine Name	Dosage	Notes
08:30	22		Risedronate	5mg	1x5mg pill. Remain upright 30 mins.
08:45	9		Carvedilol	12.5mg	1x12.5mg pill.
12:15	12		Domperidone	10mg	1x10mg pill. With water.
12:30	14		Domperidone	10mg	1x10mg pill. With water.
16:00	22		Mesalazine	800mg	2x400mg pills. With water.
20:00	14		Pravastatin	40mg	1x40mg pill.

The CQC's concern was that, should the pharmacist visit the staff room to make changes to a resident's drug regimen whilst the medicine round chart is physically out with staff on rounds, the chart may never be updated if staff forget before the chart's return. None of the setting managers recall this ever having actually happened and the CQC merely recommended a process improvement, but the company has decided to address the concern by developing a bespoke system to manage the delivery of medication to residents. The company are particularly concerned with the privacy of residents, and want to make sure that the data is held as securely as possible without burdening the staff who actually deliver the medication.

Your team has been tasked with developing a system that will allow pharmacists to adjust residents' drug regimens from the setting manager's office, producing an accurate medicine round chart which will be used by the care work supervisor on duty to dispense medication on rounds. Blossom View believe that it should be possible to complete the system within six months, including some time spent to train managers and supervisors on using the system during rollout. The company also wishes to impose the following constraints:

- The system should be accessible only on the company's internal network, or via the VPN.
- The system should save its data to a database held on-site at head office.
- The system should save an encrypted copy of the data to OneDrive each night automatically to serve as an off-site backup, while keeping the data accessible only to the company.

Your team will be responsible for the scoping, specification, design, implementation, deployment and maintenance of the system. Everything is to be completed in-house. As the company's IT manager, you are keen to ensure that, once completed, the system doesn't require too much of your staff's time to keep running. You want to keep the team free to handle their other duties.

## YOUR DEVELOPMENT TEAM

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Blossom View believe that your existing IT team will be capable of creating the system in addition to your existing duties, within the six month timeframe.

**You**  
(IT Manager)

Have been with the company for six years, with a good range of general IT knowledge and some experience with various programming languages and technologies. Performed the bulk of the development work on the existing Rota system. You envisage that you will be able to spend, on average, two days per week on the project.

**Murat**  
(IT Assistant)

Has been with the company for four years, has an IT degree from a local university with some limited programming experience. Maintains the company website and created the booking system, with some help from you. You envisage that they will be able to spend, on average, three days per week on the project, although this will be variable as he is the person who normally travels to settings when support issues arise.

**Kanato**  
(IT Assistant)

Recent graduate, hired by the company six months ago with a CS degree from a Scottish University. Has been suggesting various systems that the team could create/improve since joining, and is eager to get stuck in. Says that they're good at Java, and at HTML/CSS/JS/NodeJS. You envisage that they will be able to spend, on average, four days per week for most of the project – but will be flying home for a month just before the end of the project.

The team already uses a Kanban board to track the status of their various other duties, but does not have an established practice for managing software development projects. At the time the company's existing rota system was created, you worked alone on a largely *ad hoc* basis, as did Murat when he created the flat listing and viewing booking system on the website.

## REFERENCES

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- [1] Care Quality Commission, 'Housing with care - Guidance on regulated activities for providers of supported living and extra care housing', 2015020, Oct. 2015. Accessed: Jan. 04, 2023. [Online]. Available: [https://www.cqc.org.uk/sites/default/files/20151023\\_provider\\_guidance-housing\\_with\\_care.pdf](https://www.cqc.org.uk/sites/default/files/20151023_provider_guidance-housing_with_care.pdf)
- [2] 'Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (Text with EEA relevance) (notified under document number C(2003) 1422)', May 2003. Accessed: Jan. 04, 2023. [Online]. Available: <http://data.europa.eu/eli/reco/2003/361/oj/eng>