CONSUMER SEGMENTS & SERVICE ROBOTICS

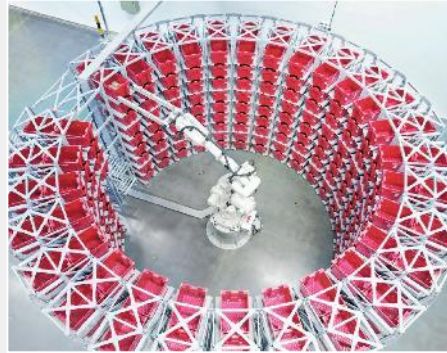# FlexBuffer™

Application Cell

ABB

FlexBuffer at glance

Solution: Central positioned robot accesses surrounding racks to buffer, sequence and store goods using smart software.

Applications: Sequencing, Buffering, Store, Order consolidation

Configurations: Single (totes) and mixed items

Customer Segments: Logistics, Food & Beverage, Healthcare, Consumer Packaged Goods, Restaurants

FlexBuffer Benefits

WHAT
The FlexBuffer is a modular cell, that offers higher performance and flexibility in sequencing, storing and buffering than the traditional automated systems.

VPP
The robot is at the heart of the system, which makes it a very reliable and low maintenance alternative to traditional solutions with many moving parts.

TRENDS
Micro fulfilment, Click & Collect and direct to consumer (D2C) are some of the rapidly growing trends driving the need for smaller systems.

PERFORMANCE METRICS
The Flexbuffer can handle a total payload of up to 50kg. The solution can store up to 600 totes and conduct sequencing operations at up to 500 cycles per hour.

FlexBuffer CONFIGURATIONS OVERVIEW

Function	Storage, Sequencer, Buffer				
Type	Mixed items (example parcels)		Totes		
Configuration	600 mm deep	1200 mm deep	Double Deep	Ultra storage	Single Deep Seq.

APPLICATIONS

How the solution works:
The robot receives commands to store goods fed in on the inbound conveyor. Based on system commands the robot stores the goods in the defined rack positions. On command the robot picks requested goods and puts these on the outfeed conveyor.

Buffering of mixed items
Example: Sequencing of outgoing grocery orders in standard totes to optimize van loading.

Storage & Retrieval of totes
Example: Storage of high runner return items in warehousing of apparel or general merchandise.

Customer segments

FlexBuffer™ solving customer problems

CUSTOMERS

- **Logistics** industry needs to ramp up automation efforts to compensate labor scarcity, decreasing qualifications to answer increasing demand
- **Food & Beverage and CPG** industry experiences increasing pressure by eCommerce and starts to establish direct to consumer (D2C) channels requiring substantial changes in fulfillment and distribution infrastructure
- **Pharma & Healthcare** industry emphasize to increase automation efforts and investments to relieve existing workforce while increasing capacities
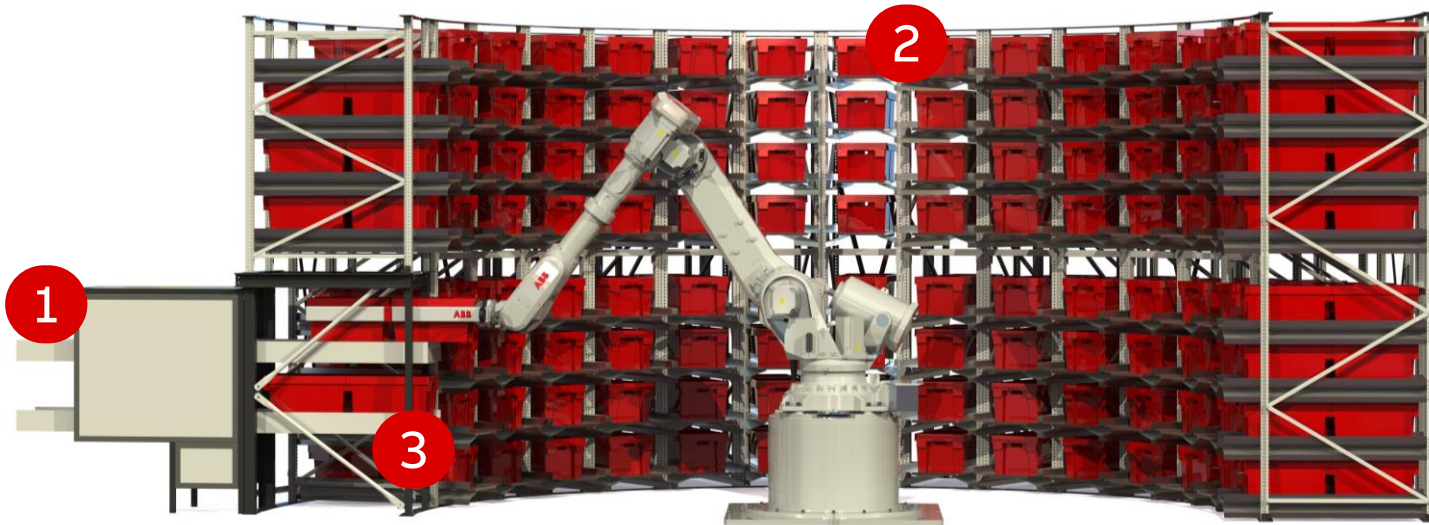
CSSR SOLUTIONS

- The FlexBuffer combines ABB domain expertise in Robotics with a customer centric approach offering a solution that solves customer problems in all segments
- FlexBuffer automates small scale storage, sequencing or buffering tasks with vast possibilities for storage logic customization and small system footprint
- FlexBuffer allows customers to automate manual labor while at the same time increasing performance, capacity and accuracy when solving complex buffering, retrieval or sequencing tasks

BENEFIT

- Robot dexterity allows for mixed item storage and retrieval in small and confined spaces
- A small footprint allows for simple retro-fitting of existing infrastructure and scaled deployments in brownfields
- Robot is the only moving system of the solution which makes it a very reliable and low maintenance in comparison to traditional systems
- Customer centric solution with integrated hardware & software from ABB, with a modular design to handle a mixture of cases, cartons, totes and trays, all with one system

ABB

Solution Intro
Operating principle

How the solution works:

1. The robot receives commands to store goods fed in on the **infeed conveyor**

2. Based on system commands the robot stores the goods in the defined **rack positions**

3. On command the robot retrieves requested goods and puts these on the **outfeed conveyor**.

Buffering of totes
Example: Buffering larger quantities of produced beverages before moving to outbound for further packaging or palletizing.

Storage & Retrieval of totes
Example: Storage & retrieval of high runner return items in warehousing of apparel or general merchandise.

Sequencing of totes
Example: Sequencing of bins/totes before palletizing in grocery distribution to stores/supermarkets.
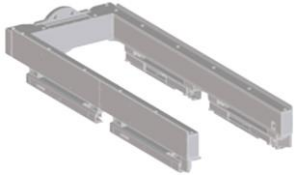
The Offering

What is included

Robot

– Raiser

– IRB 6700, 3,2m, 150kg

– Robot options, dress pack

Gripper

– Double tote gripper with independent clamping mechanism

Racking

– Double deep rack to store two totes in a row

– 15 racks pairs

Peripherals

– Controls

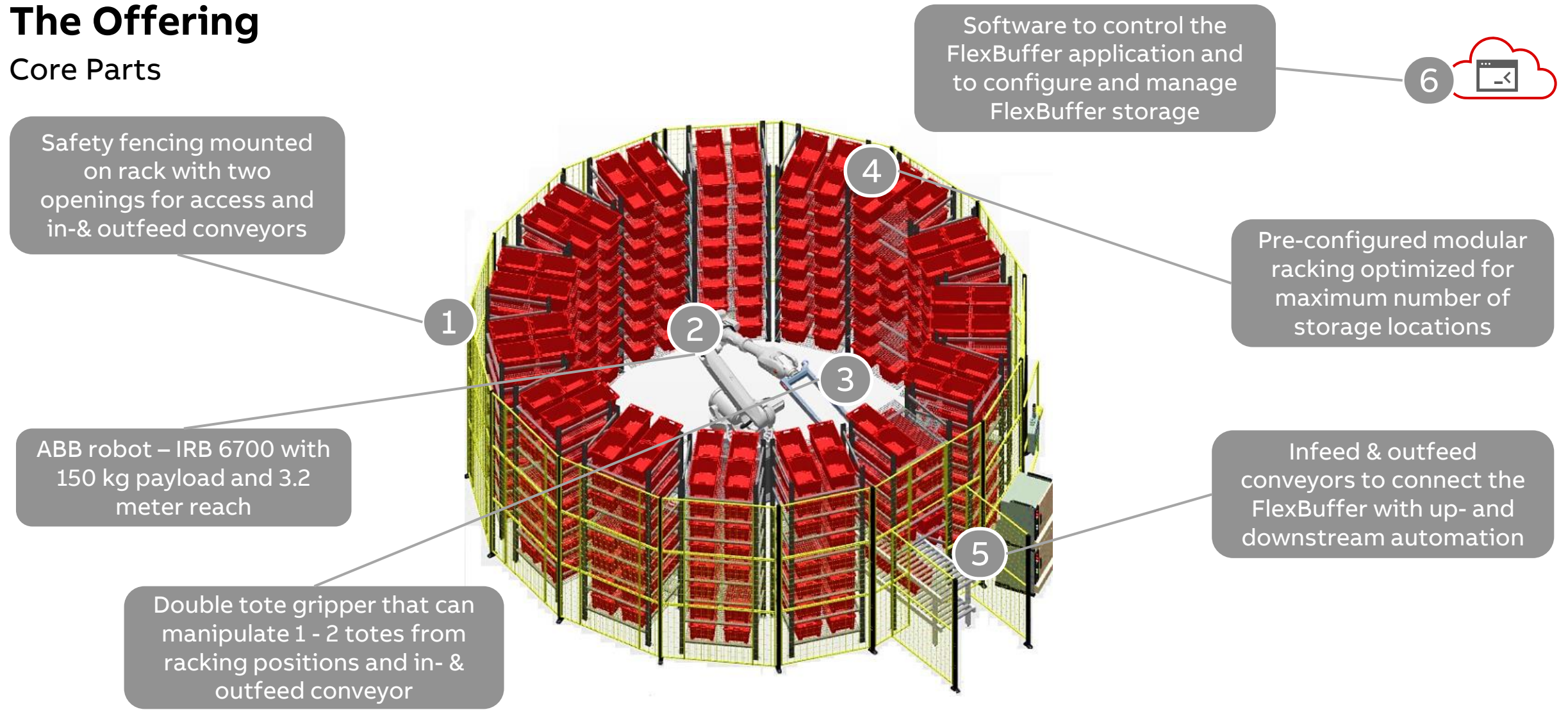– Infeed conveyor including stopping sections

– Outfeed conveyor

Software

– Application Controller – FlexBuffer storage management

– Robot Rapid software

– Industrial PC

Safety
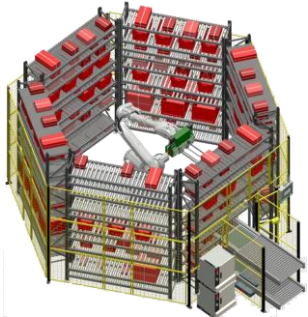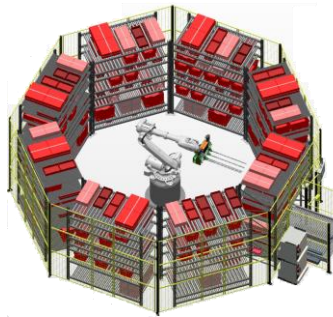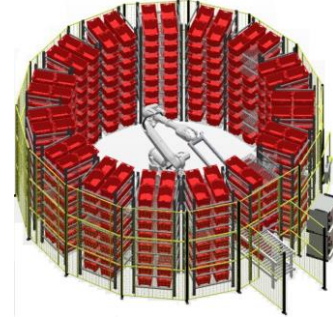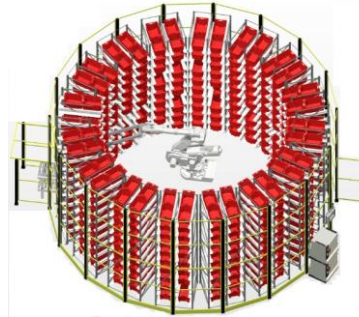
– Access door

– Safety PLC

– Fencing mounted to the rack

1. Example configuration

The Offering
Core Parts

Safety fencing mounted on rack with two openings for access and in-& outfeed conveyors (1)

Software to control the FlexBuffer application and to configure and manage FlexBuffer storage (6)

Pre-configured modular racking optimized for maximum number of storage locations (4)

ABB robot – IRB 6700 with 150 kg payload and 3.2 meter reach (2)

Infeed & outfeed conveyors to connect the FlexBuffer with up- and downstream automation (5)

Double tote gripper that can manipulate 1 - 2 totes from racking positions and in- & outfeed conveyor (3)

ABB

FlexBuffer™ Configurations

Performance parameters & metrics

Type	Mixed		Totes		
Configuration	Configuration 1 600mm deep	Configuration 2 1200mm deep	Configuration 3 double deep	Configuration 4 ultra storage	Configuration 5 single deep sequencer
Storage capacity	210 items (assuming avg. item dimensions of 600 x 400 x 350)	480 items (assuming avg. item dimensions of 600 x 400 x 350)	452 totes (size of 600 x 400 x 350)	612 totes (size of 600 x 400 x 350)	36 totes (size of 600 x 400 x 350)
Design performance — Single cycle* performance	356 cycles/hour*	291 cycles/hour*	288 cycles/hour*	283 cycles/hour*	543 cycles/hour*
Combined cycle* performance	181 cycles/hour*	146 cycles/hour*	145 cycles/hour*	143 cycles/hour*	261 cycles/hour*
Max. payload	35 kg (gripper payload)	35 kg (gripper payload)	25 kg per tote	12.5 kg per tote	25 kg per tote
Used robots	**IRB 6700-150/3.2**	**IRB 6700-150/3.2**	**IRB 6700-150/3.2**	**IRB 6650S-125/3.5**	**IRB 460-110/2.4**

FlexBuffer™ Software

FlexBuffer Control System - Overview

STORAGE & RETRIEVAL MANAMGENT

The FlexBuffer control software contains following modules:

1. Warehouse configuration to define the available locations
2. Warehouse management to connect FlexBuffer storage locations with stored items
3. Robot tasks handling to control the robot movement
4. Infeed management: intake of products from other system (WMS/ERP/MFC*)
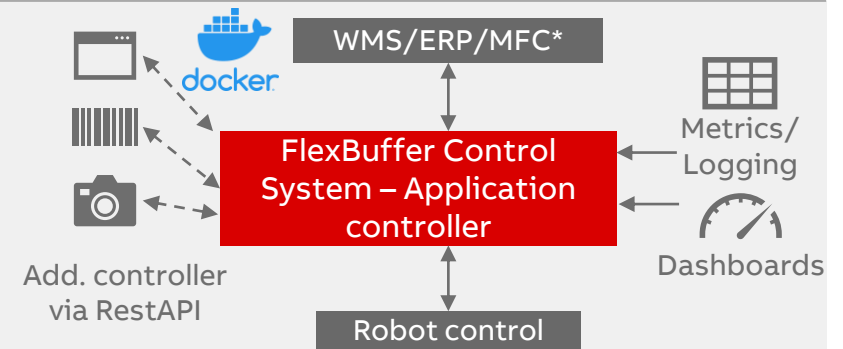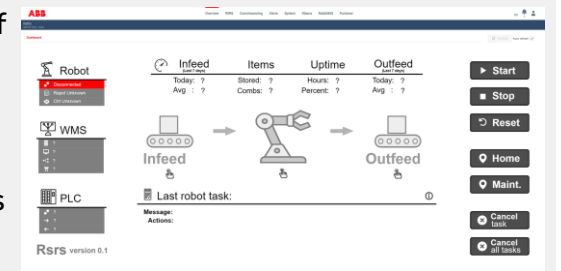5. Outfeed management: outtake of products towards other system (WMS/ERP/MFC*)

INTEGRATION

– Docker based application controller
– Additional controller periphery can easily be added
– Using OPC UA protocol complying with industry 4.0 standards

WMS/ERP/MFC*

FlexBuffer Control System – Application controller

Metrics/ Logging

Dashboards

Add. controller via RestAPI

Robot control

USER INTERFACE

A web-based platform independent user interface

– ABB look and feel – consistent application interface
– One screen for all errors, logs and dashboards
– MQTT protocol for application controller to user interface

– Supports SCADA communication for control rooms
– No PLC screen required
– General control of the robot
– Error handling (robot & system)
– Option for manual warehouse control

SOFTWARE

– Patented logic for storage management of mixed items to avoid collisions and to optimize storage utilization
– Virtual storage location logic for user interface visualization
– Application controller can combine various ABB solutions

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September 7, 2021 | Slide 8   CSSR Sales Pack: FlexBuffer - Modular Cell; *Warehouse Management System, Enterprise Resource Planning, Material Flow Control