Achieving Optimal Connectivity in the Histology Lab: Using LANs and WANs to Improve Quality and Productivity

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Agenda

- Connectivity Overview
- Customer Example
- Suggestions for Implementation
- Q & A / Discussion

Common criteria and challenges

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Criteria

- Quality
- Patient Safety
- Improve work process
- Ease of use
- Flexibility
- Cost

Challenges

- Increasing workload
- Improving TAT
- Maximizing use of resources
- Improve outcomes
- Traceability
- Space limitations

Why connectivity?

- Eliminate manual data entry
- Reduce possibility of errors
- Maximize employee resources
- Track specimens and slides
- Manage workflow / workload
- Growth without increase in FTEs
- ***Better patient care!***

Behind every stain there is a face

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What is connectivity?

"A Program or Device's ability to link with other Programs and Devices for exchange (Import / Export) of data in various formats"

What is LAN and WAN connectivity?

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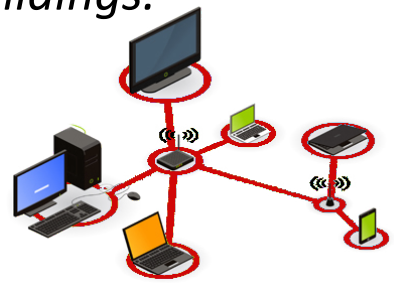
LAN - Local Area Network

A LAN connects network devices over a relatively short distance. A networked office building, school, or home usually contains a single LAN, though sometimes one building will contain a few small LANs (perhaps one per room), and occasionally a LAN will span a group of nearby buildings.



WAN - Wide Area Network

As the term implies, a WAN spans a large physical distance and is a geographically dispersed collection of LANs. A network device called a router connects LANs to a WAN.

Now available for histology…
… connectivity options to meet your needs

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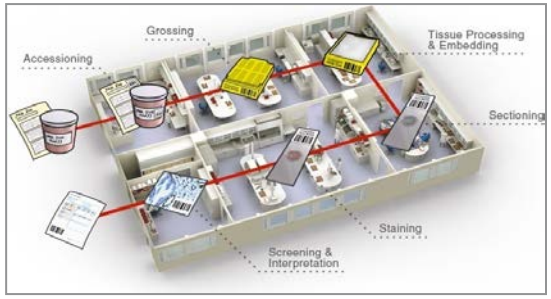
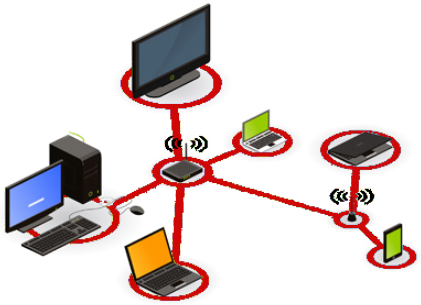
Instrument Connectivity

LIS Connectivity

Tracking connectivity



LAN Connectivity



WAN Connectivity

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Single server with LAN and/or WAN

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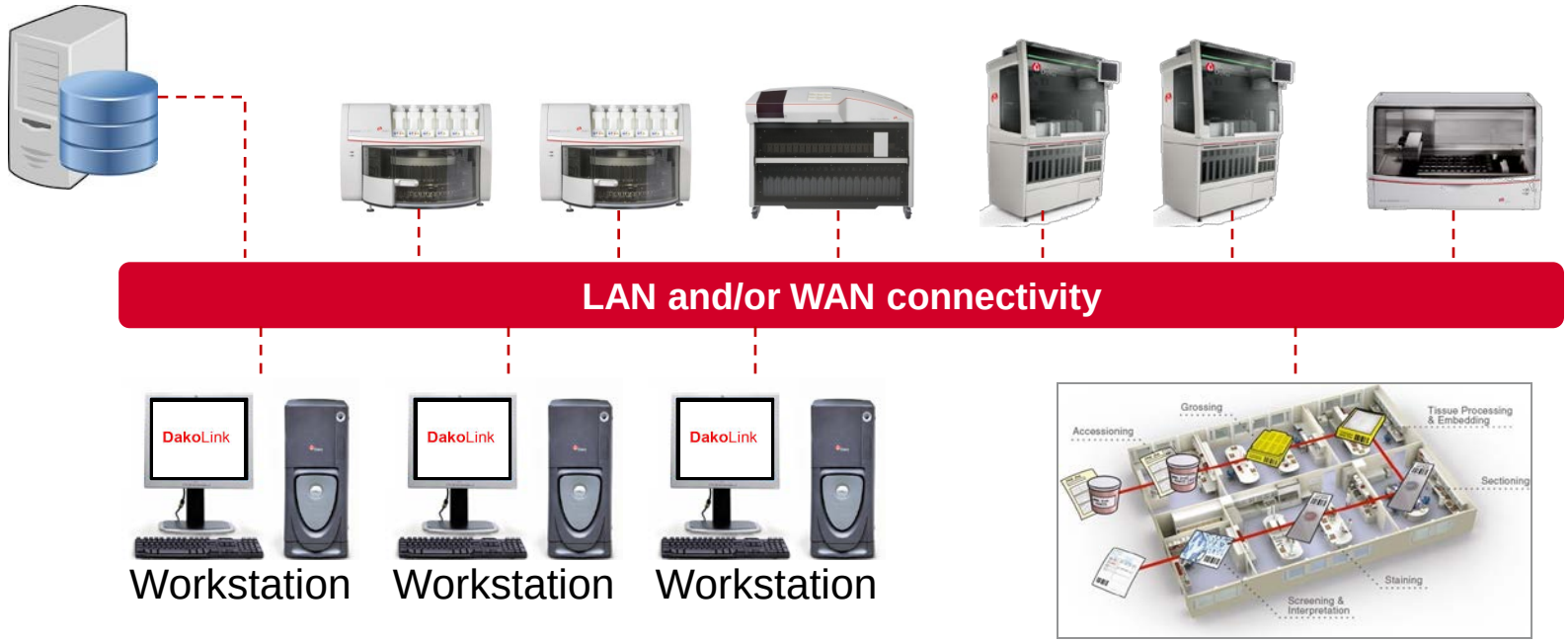
Single Server



Critical information can be accessed where it is most needed, when it is most needed.

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Possibilities for histology

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- LAN seat deployment – enables info access from any computer
- Print on demand labels – from LIS or individual workstations
- Standardization of staining – sharing of protocols across instruments
- Seamless menu and instrument expansion and modifications
- Centralized antibody preparation, optimizations, and validations
- Inter-lab QC proficiency management
- Multi-site contingency for instruments and reagents
- Track and trace – slide status, lot #s, reagent expiry
- Reporting functions – easy data mining, monitor usage, control material
- Share reagents, send pre-labeled slides to other sites

WAN connectivity

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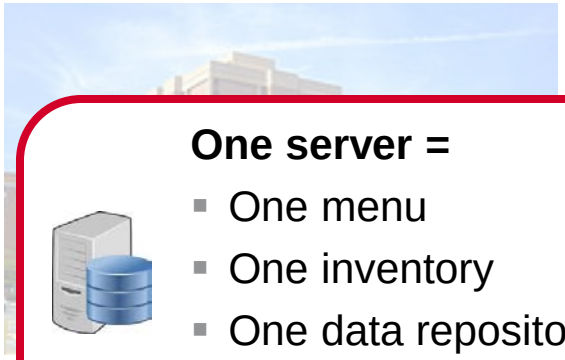
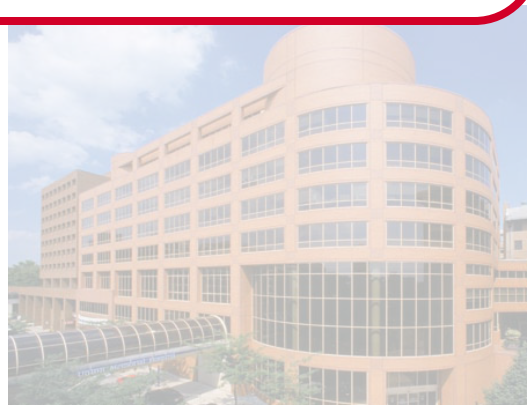
Single Server



One server =

- One menu
- One inventory
- One data repository

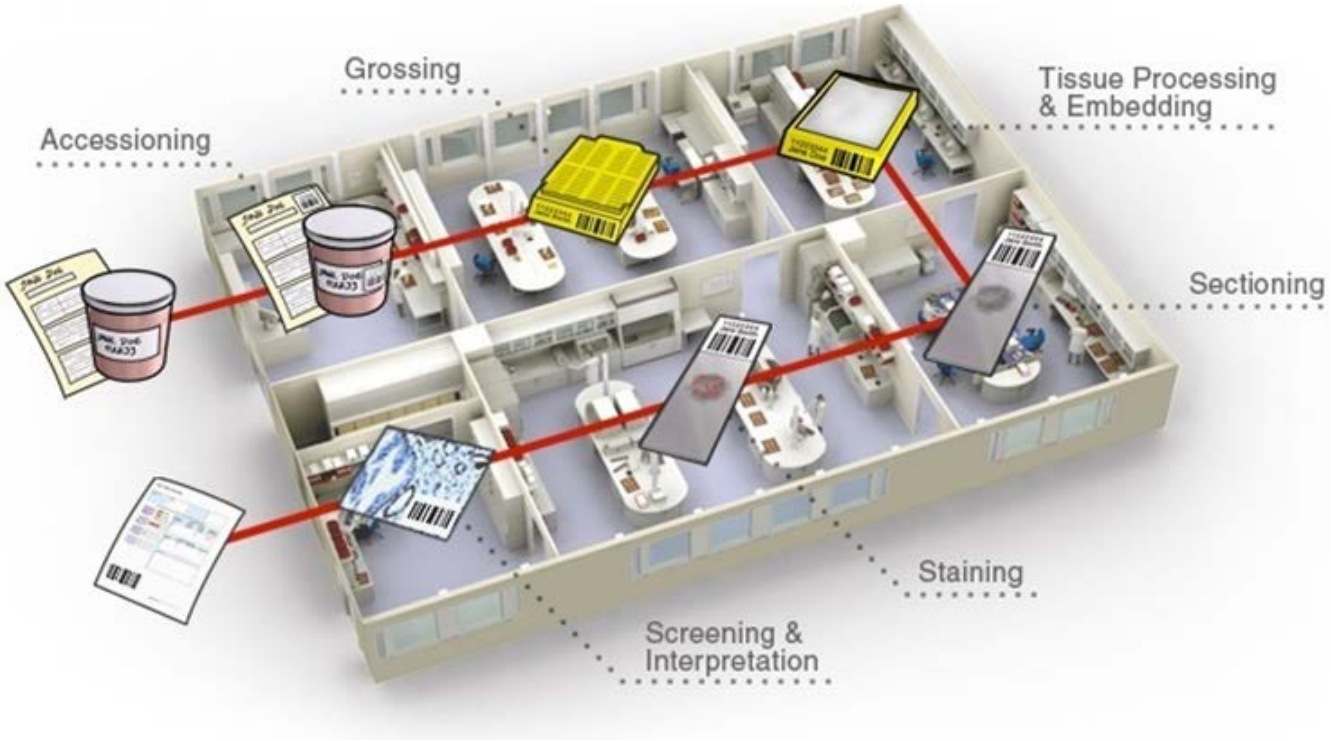
= Multitude of customizable connectivity solutions



Other possibilities for histology

- Remote customer support
  - Perform software upgrades as soon as they are available
  - Troubleshoot problems without travel delays
  - Assist with data collection

Track and trace solutions on LAN



Know where every specimen, cassette, block, or slide is in the process from the time it is received until the slide is archived

WAN for multi-site setting

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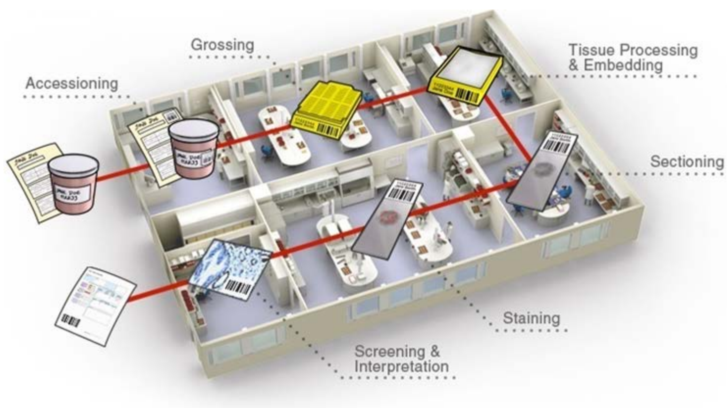

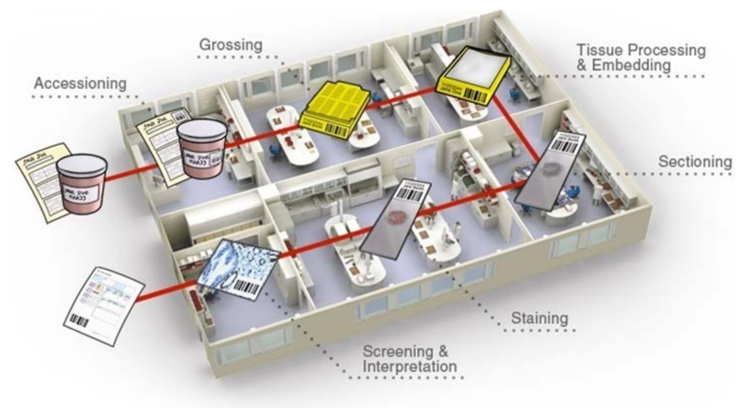

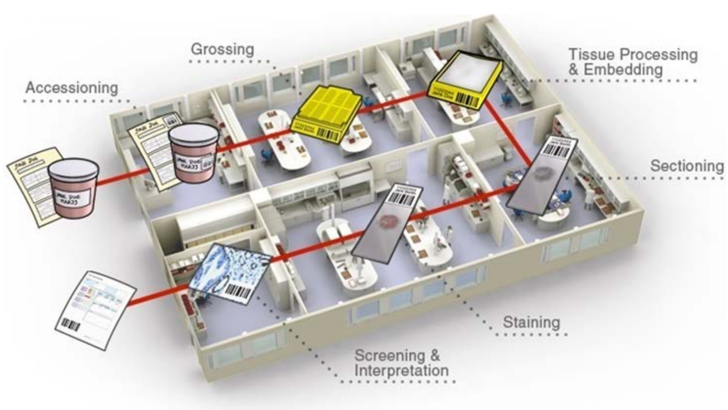

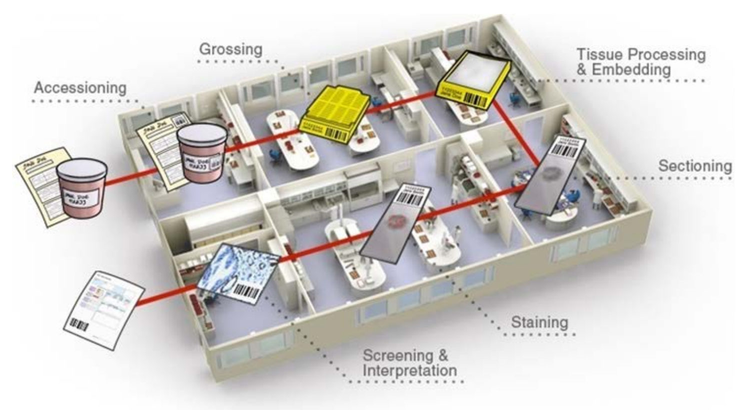

Monitor remotely or from anywhere within the healthcare system

Every organization is unique

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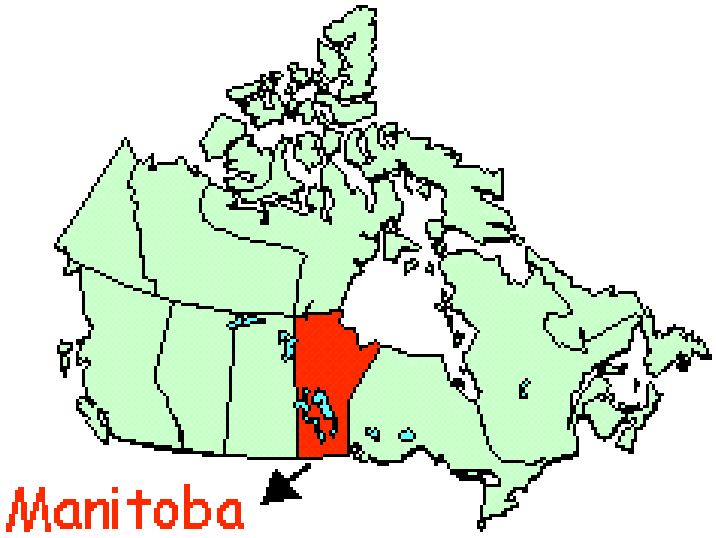

- Population = 1.2 million
- Size = 649,950 km^2
  (250,950 sq mi)

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Utilized connectivity solutions at DSM

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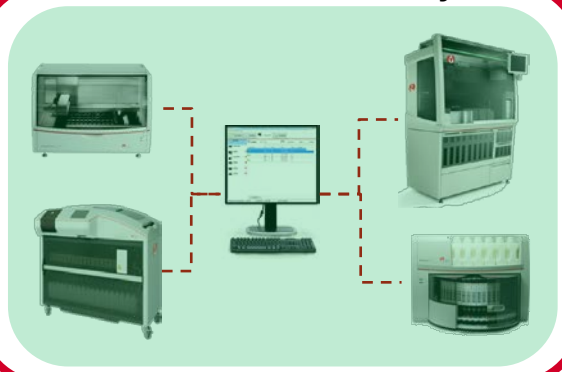
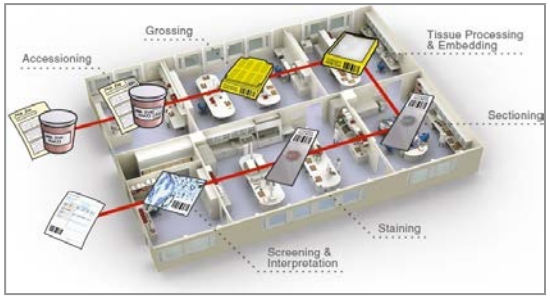
Instrument Connectivity

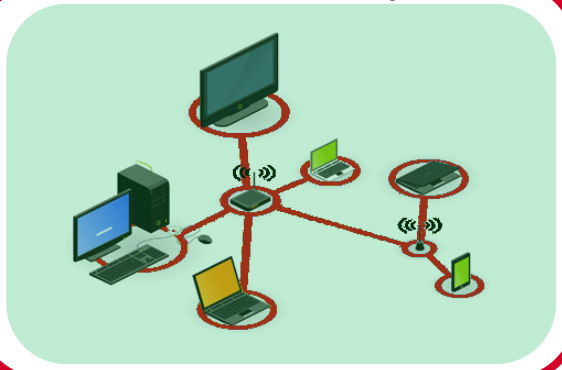


LIS Connectivity

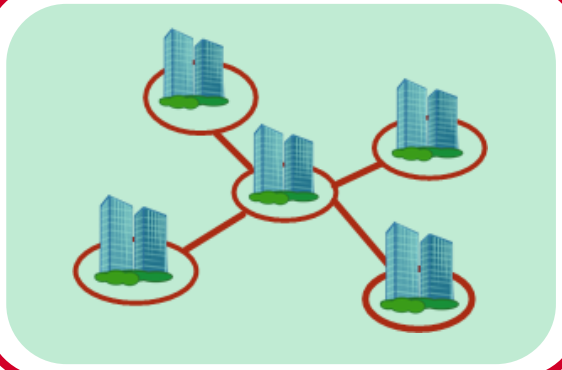
Tracking connectivity



LAN Connectivity



WAN Connectivity



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DSM IHC instrumentation

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Single Server

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Winnipeg

Hôpital St-Boniface Hospital

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Westman Regional Lab

GRACE HOSPITAL

No Dako instrumentation

LAN and WAN connectivity benefits

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- Reduction of potential for errors = Quality
- Optimized human resources utilization
- Save technical time
- Pathologist satisfaction
  - Flexibility to adapt menu
  - Standard staining
- Cost reduction
- Improved TAT

DSM LAN and WAN connectivity

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Wide Area Network (WAN) utilized applications at:

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MANITOBA

- LAN seat utilization

LAN seat utilization

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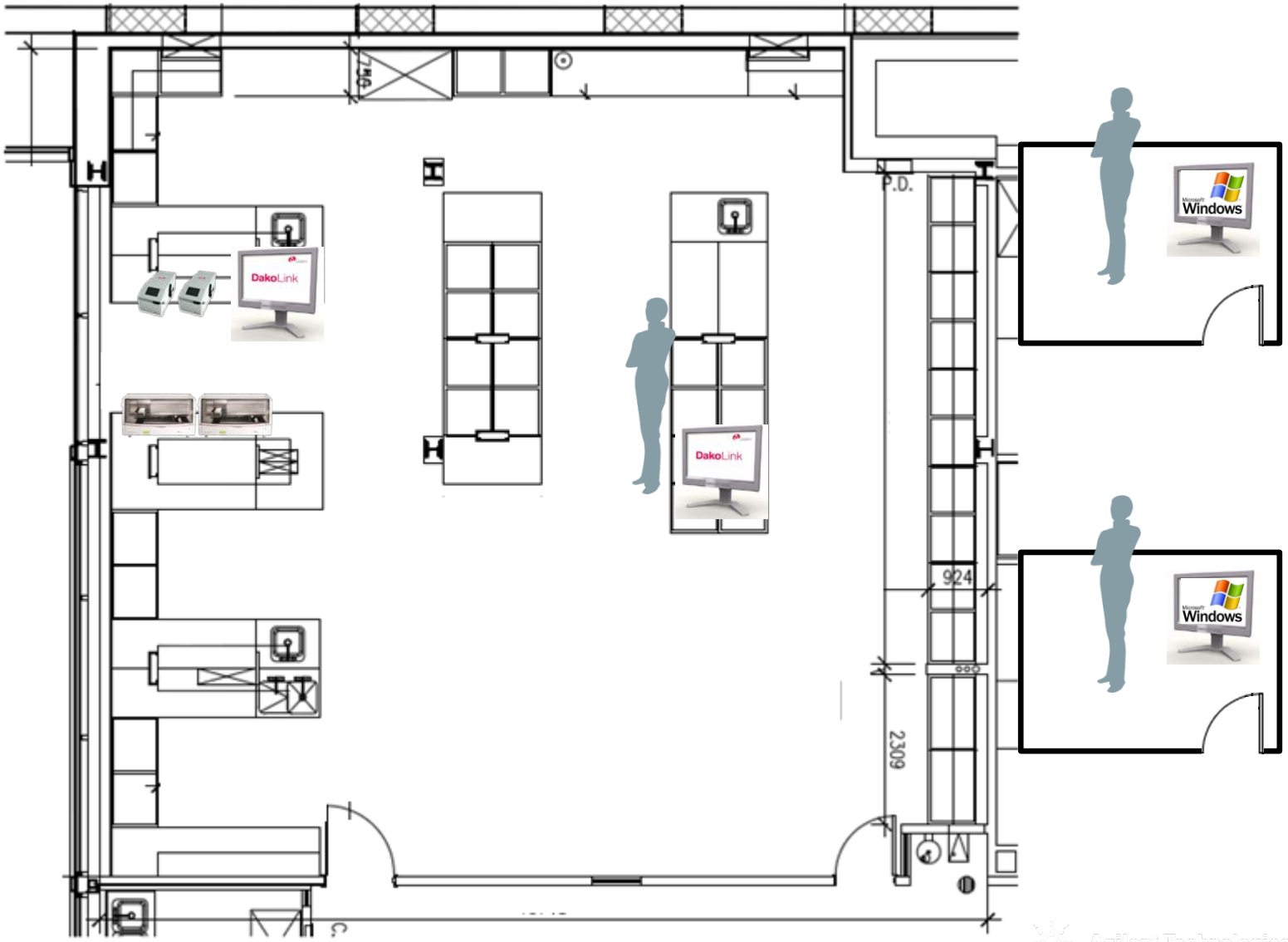
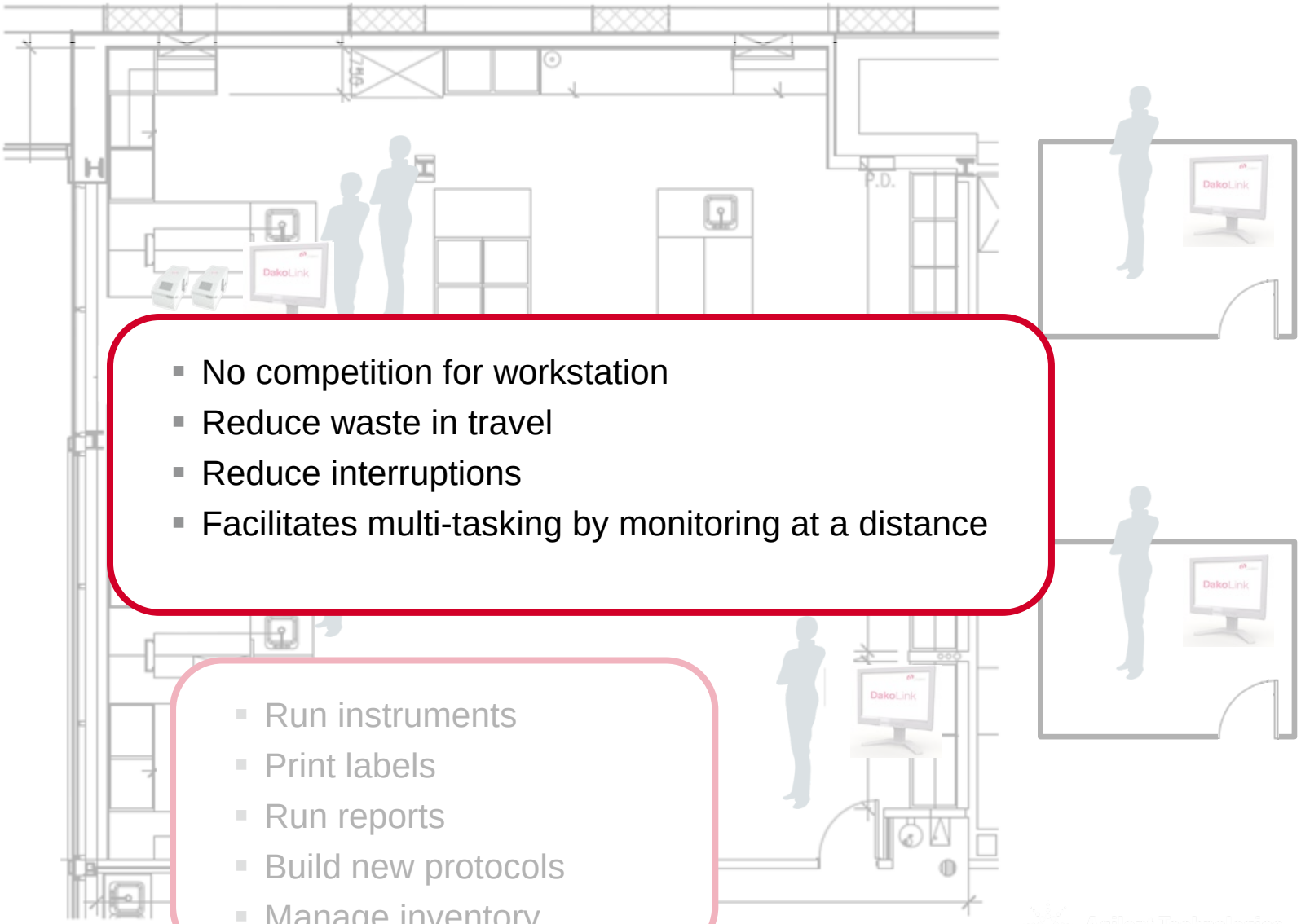
LAN seat utilization



LAN seat utilization



- No competition for workstation
- Reduce waste in travel
- Reduce interruptions
- Facilitates multi-tasking by monitoring at a distance

- Run instruments
- Print labels
- Run reports
- Build new protocols
- Manage inventory

DSM LAN and WAN connectivity

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Wide Area Network (WAN) utilized applications at:

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- LAN seat utilization
- Print on demand at Grace Hospital

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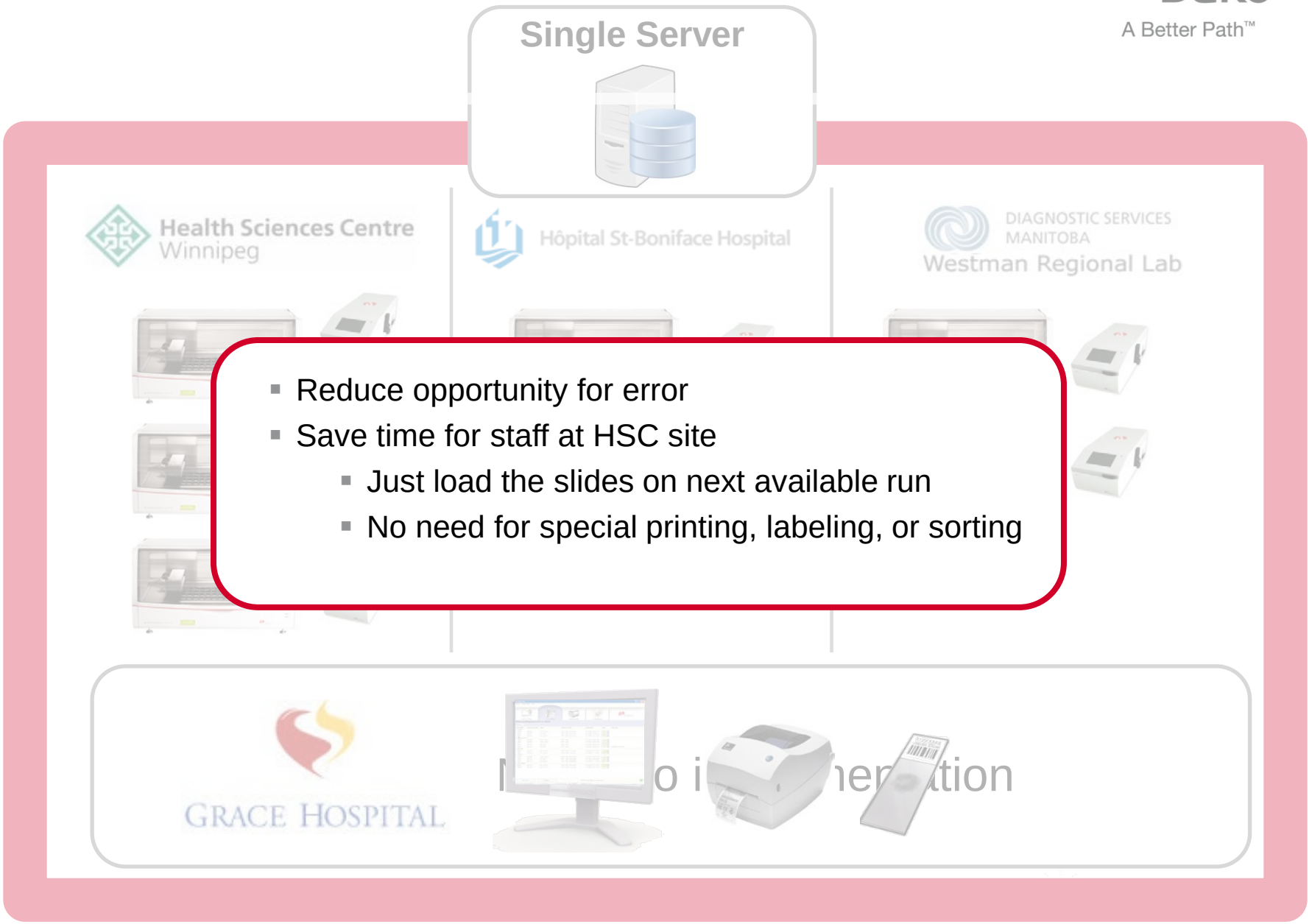
LAN seat utilization

Print on demand at Grace Hospital



- Reduce opportunity for error
- Save time for staff at HSC site
  - Just load the slides on next available run
  - No need for special printing, labeling, or sorting

DSM LAN and WAN connectivity

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Wide Area Network (WAN) utilized applications at:

DIAGNOSTIC SERVICES MANITOBA

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- Centralized antibody preparation, optimization, and validations

Centralized preparation, optimization and validations

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Westman Regional Lab

Antibody preparation

Optimizati

New lot validation

- All done at one site with one database
  - = Quality of preparation
  - = Eliminated triplication of work
  - = Save time for less staffed sites
  - = Connectivity eliminated paper work

DSM LAN and WAN connectivity

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Wide Area Network (WAN) utilized applications at:

DIAGNOSTIC SERVICES MANITOBA

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- Seamless menu expansion and modifications

Seamless menu expansion

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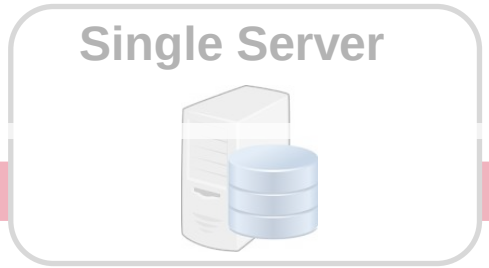

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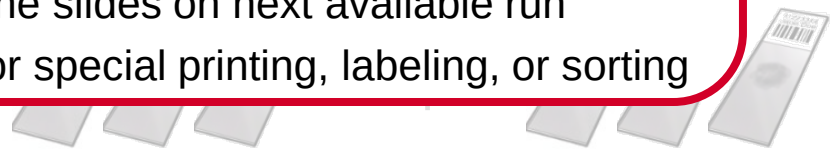
DSM menu **All antibodies**

Most common antibodies

Most common antibodies

- Protocol optimization at one site only
- Easy changes of menu
  - “flip the switch” across network
- Pre-labeled slides save time for staff at HSC site
  - Just load the slides on next available run
  - No need for special printing, labeling, or sorting



DSM LAN and WAN connectivity

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- Seamless menu expansion and modifications
- Standardization of staining

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Standardization of staining

- Stain can be exactly the same regardless of where the slide is ordered
- Pathologists work at different sites and appreciate this standardization

DSM LAN and WAN connectivity

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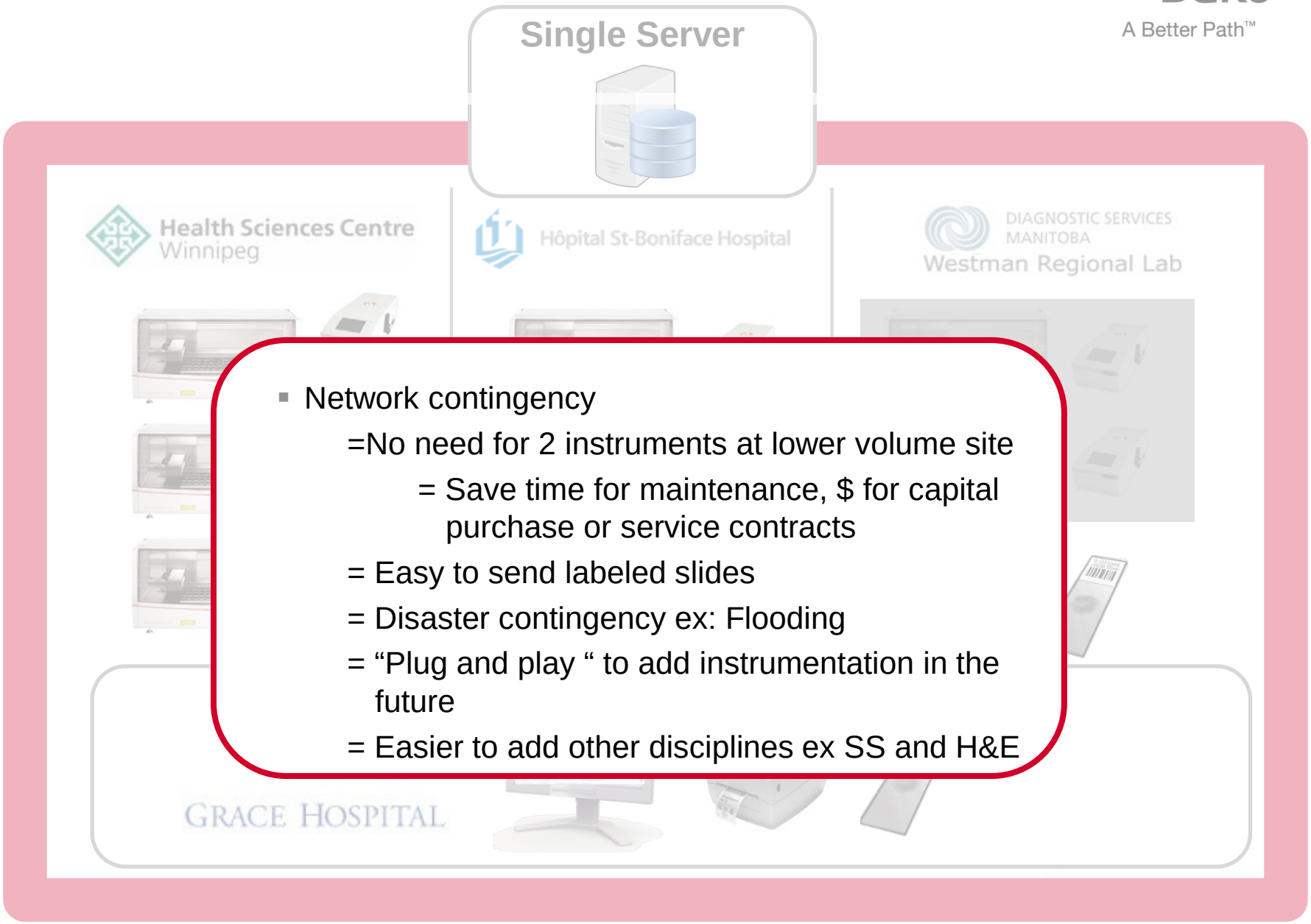
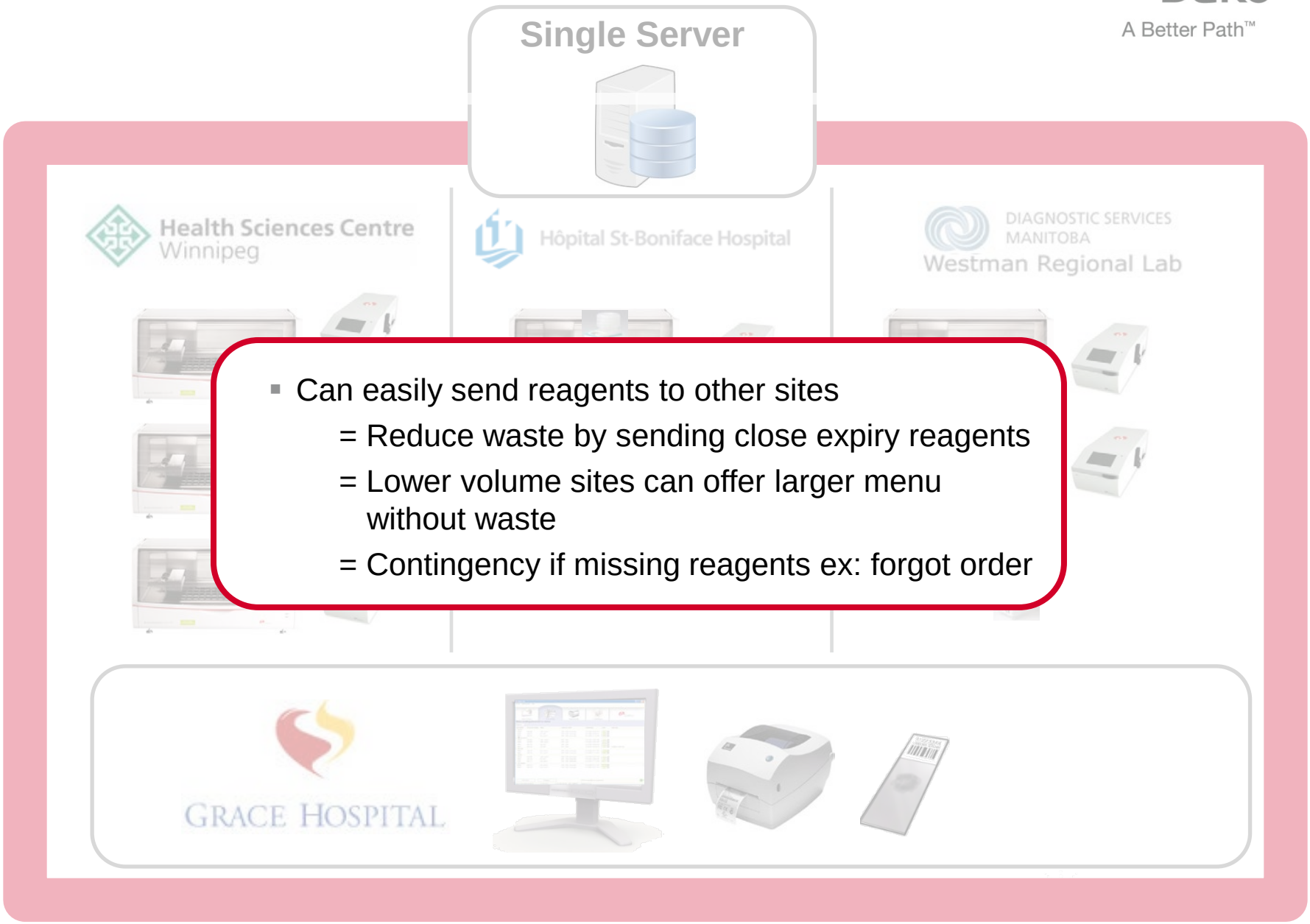
- Multi-site contingency: Instruments, reagents

Multi-site contingency: Instrumentation



- Network contingency
  - =No need for 2 instruments at lower volume site
    - = Save time for maintenance, $ for capital purchase or service contracts
  - = Easy to send labeled slides
  - = Disaster contingency ex: Flooding
  - = “Plug and play “ to add instrumentation in the future
  - = Easier to add other disciplines ex SS and H&E

Multi-site contingency: Reagents



- Can easily send reagents to other sites
  - = Reduce waste by sending close expiry reagents
  - = Lower volume sites can offer larger menu without waste
  - = Contingency if missing reagents ex: forgot order

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Wide Area Network (WAN) utilized applications at:

DIAGNOSTIC SERVICES MANITOBA

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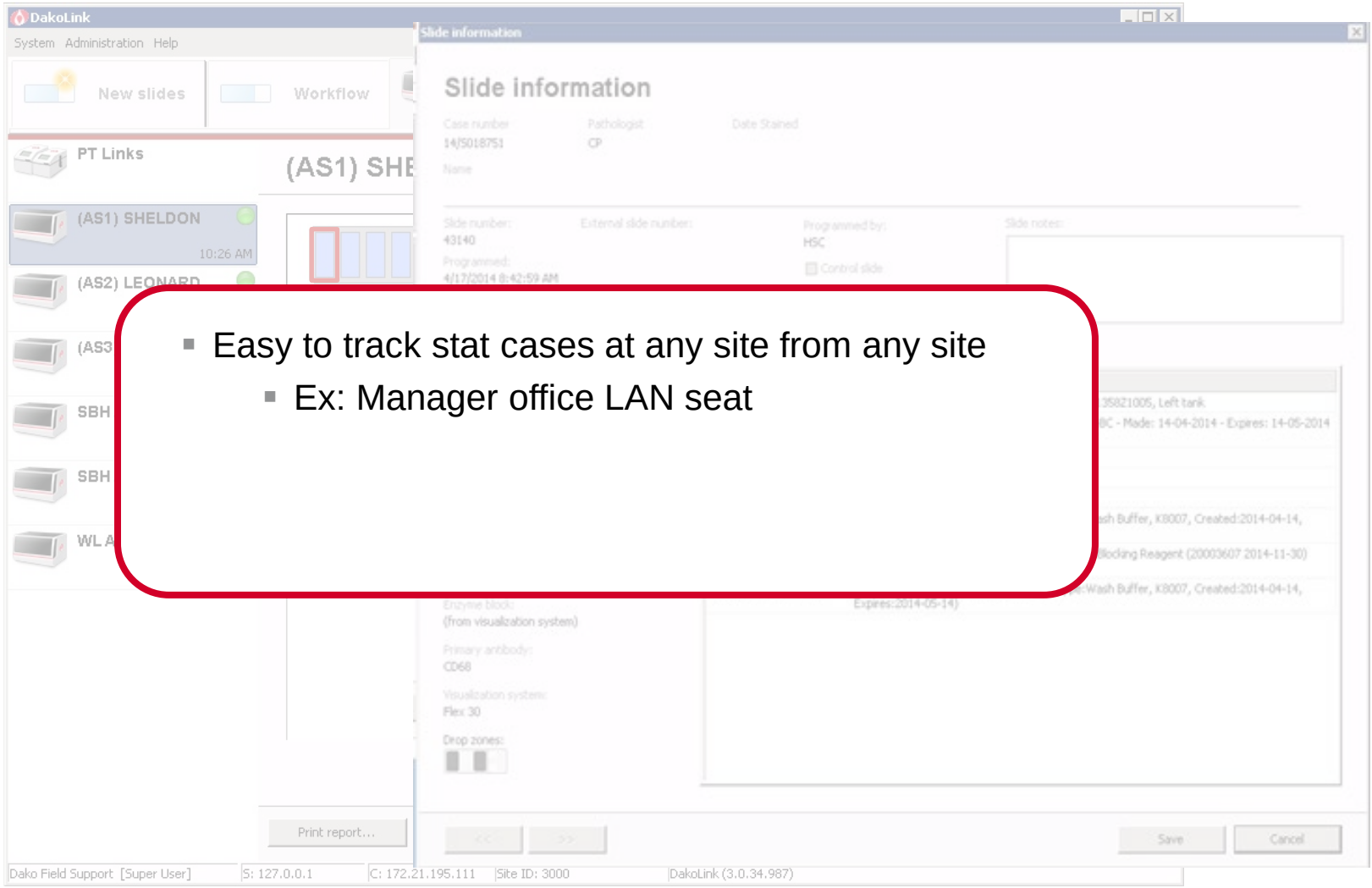
- Multi-site contingency: Instruments, reagents
- Track and trace: Slides status

Track and trace: Status of slides



- Easy to track stat cases at any site from any site
  - Ex: Manager office LAN seat

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- Multi-site contingency: Instruments, reagents
- Track and trace: Slides status
- Reports: Easy data mining, monitor usage

Reports: Easy data mining

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Protocol steps | Slide log

Time	Log
11/21/2012 7:15:46 AM	PT Link run started on PT 2 at 11/21/2012 7:15 AM
11/21/2012 7:56:14 AM	PT Link run completed on PT 2 11/21/2012 7:56 AM.
11/21/2012 7:56:14 AM	TR Fluid was High LHSC mixed 11/20/2012 Cycle 1 of 3
11/21/2012 7:56:14 AM	PT Link run log: "2012-11-21-0715-PT 2-L.dta"
11/21/2012 8:16:09 AM	Staining started
11/21/2012 8:17:21 AM	Rinsed with buffer (00085374 2012-12-28)
11/21/2012 8:24:33 AM	Blow and apply 150 µl EnVision FLEX Peroxidase-Blocking Reagent (00085345 2013-08-31) [1,3]
11/21/2012 8:29:40 AM	Rinsed with buffer (00085374 2012-12-28)
11/21/2012 8:48:34 AM	Blow and apply 150 µl FLEX Cytokeratin, MxH (AE1/AE3) (10067833 2014-02-28) [1,3]
11/21/2012 9:08:40 AM	Rinsed with buffer (00085374 2012-12-28)
11/21/2012 9:38:40 AM	Rinsed with buffer (00085374 2012-12-28)
11/21/2012 9:45:07 AM	Blow and apply 150 µl EnVision FLEX /HRP (00085348 2013-08-31) [1,3]
11/21/2012 10:05:17 AM	Rinsed with buffer (00085374 2012-12-28)
11/21/2012 10:30:20 AM	Rinsed with buffer (00085374 2012-12-28)
11/21/2012 10:39:01 AM	Blow and apply 150 µl Substrate Working Solution (mix) (00086495 2013-08-31) [1,3]
11/21/2012 10:49:02 AM	Rinsed with buffer (00085374 2012-12-28)
11/21/2012 10:49:02 AM	Staining completed

Reports: Easy data mining

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Reagent Bottle Information

Serial number
2521ZKE

Lot
00085353

User-defined bottle
☐

Expiration date
2013-08-31

Code
SM80320

Current quantity
200

Reagent name
Substrate Working Solution (mix)

Original quantity
20000

Usage

Date	Amount in µl
11/19/2012	19800

Slides this reagent was applied to

	Case number	Name	Protocol	Completion time
107383	S12-45954		Toxoplasma	11/19/2012 11:23:58 AM
107384	S12-45954		CD20	11/19/2012 11:24:04 AM
107385	S12-45954		CD79	11/19/2012 11:24:11 AM
107386	S12-45954		BCL2	11/19/2012 11:24:18 AM
107387	S12-45954		UNC Mouse	11/19/2012 11:24:25 AM
107388	S12-45954		UNC Rabbit	11/19/2012 11:25:17 AM
107706	S12-45343		CKAE1/AE3	11/19/2012 1:38:34 PM
107707	S12-45343		CKCAM5.2	11/19/2012 1:38:41 PM
107708	S12-45343		SMA	11/19/2012 1:39:33 PM
107709	S12-45343		Desmin	11/19/2012 1:39:40 PM
107710	S12-45343		S100	11/19/2012 1:39:46 PM
107711	S12-45343		UNC Mouse	11/19/2012 1:39:53 PM
107712	S12-45343		UNC Rabbit	11/19/2012 1:40:00 PM
107719	S12-45824		CD20	11/19/2012 11:16:14 AM
107720	S12-45824		CD138	11/19/2012 11:27:36 AM
107721	S12-45824		CD3	11/19/2012 11:16:21 AM
107722	S12-45824		CD5 4C7	11/19/2012 11:16:28 AM
107723	S12-45824		CD23 DAK-CD23	11/19/2012 11:16:35 AM
107724	S12-45824		Kappa	11/19/2012 11:18:08 AM

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Reports: Easy data mining

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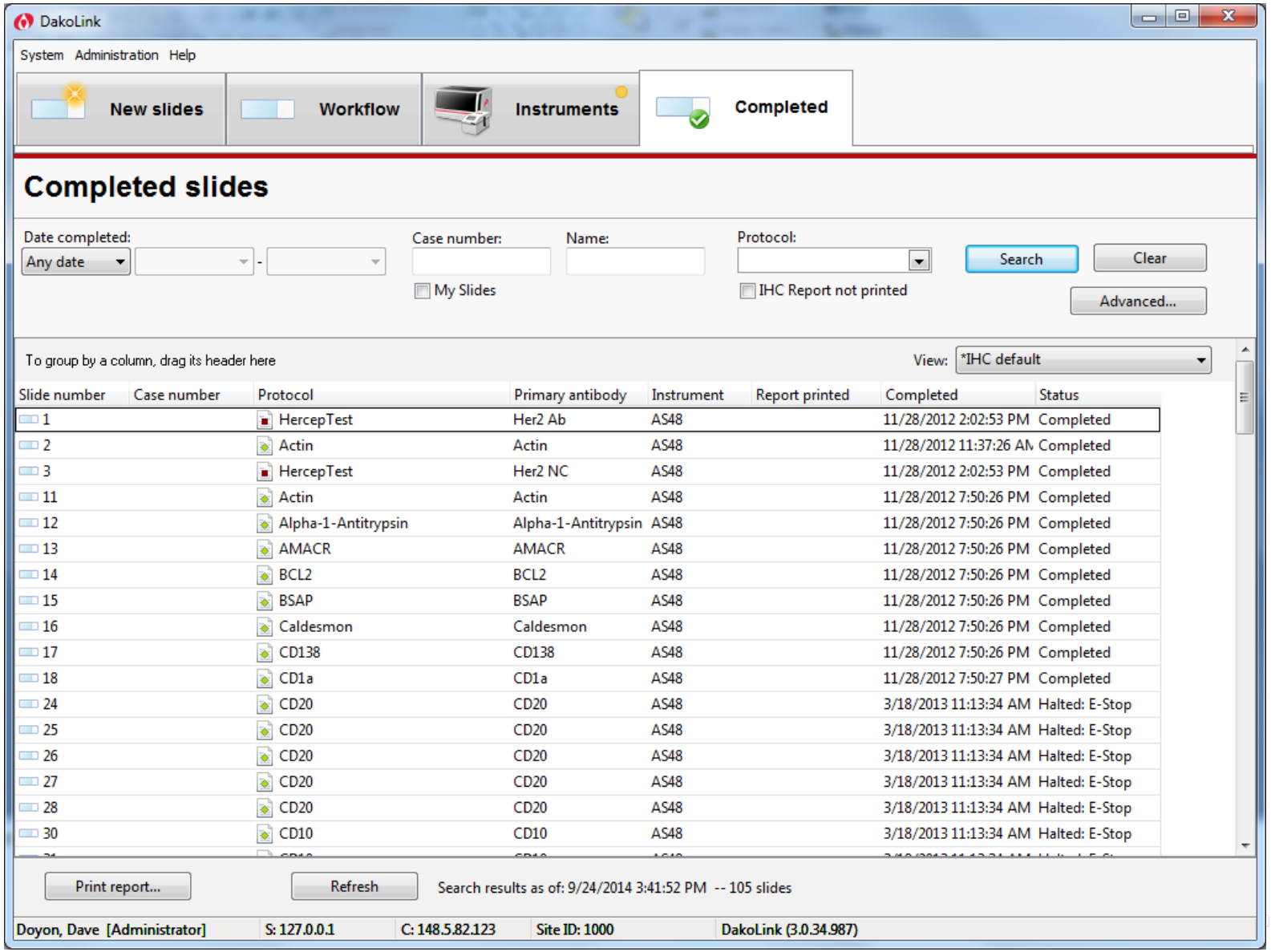

Reports: Easy data mining

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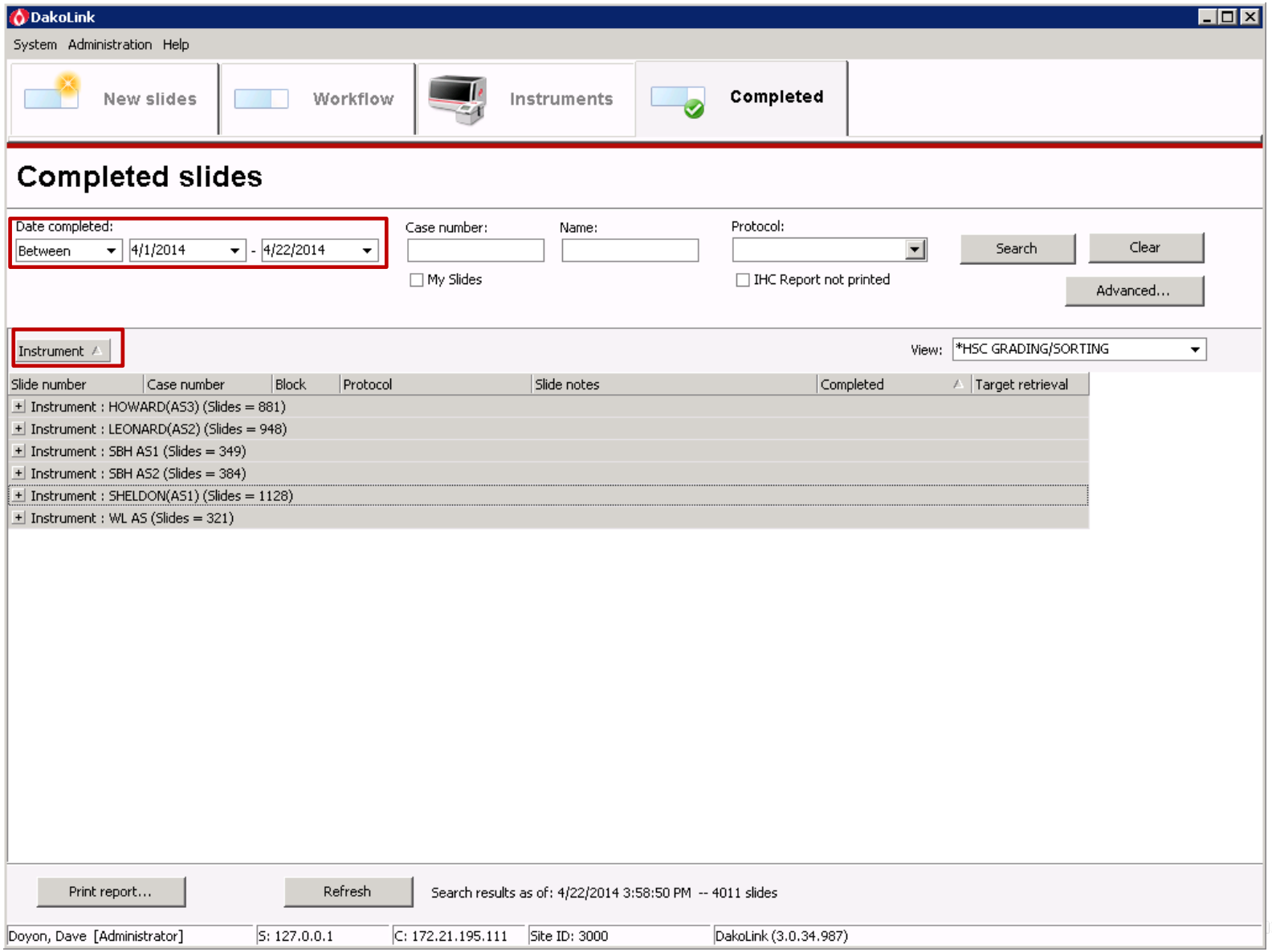

Reports: Easy data mining

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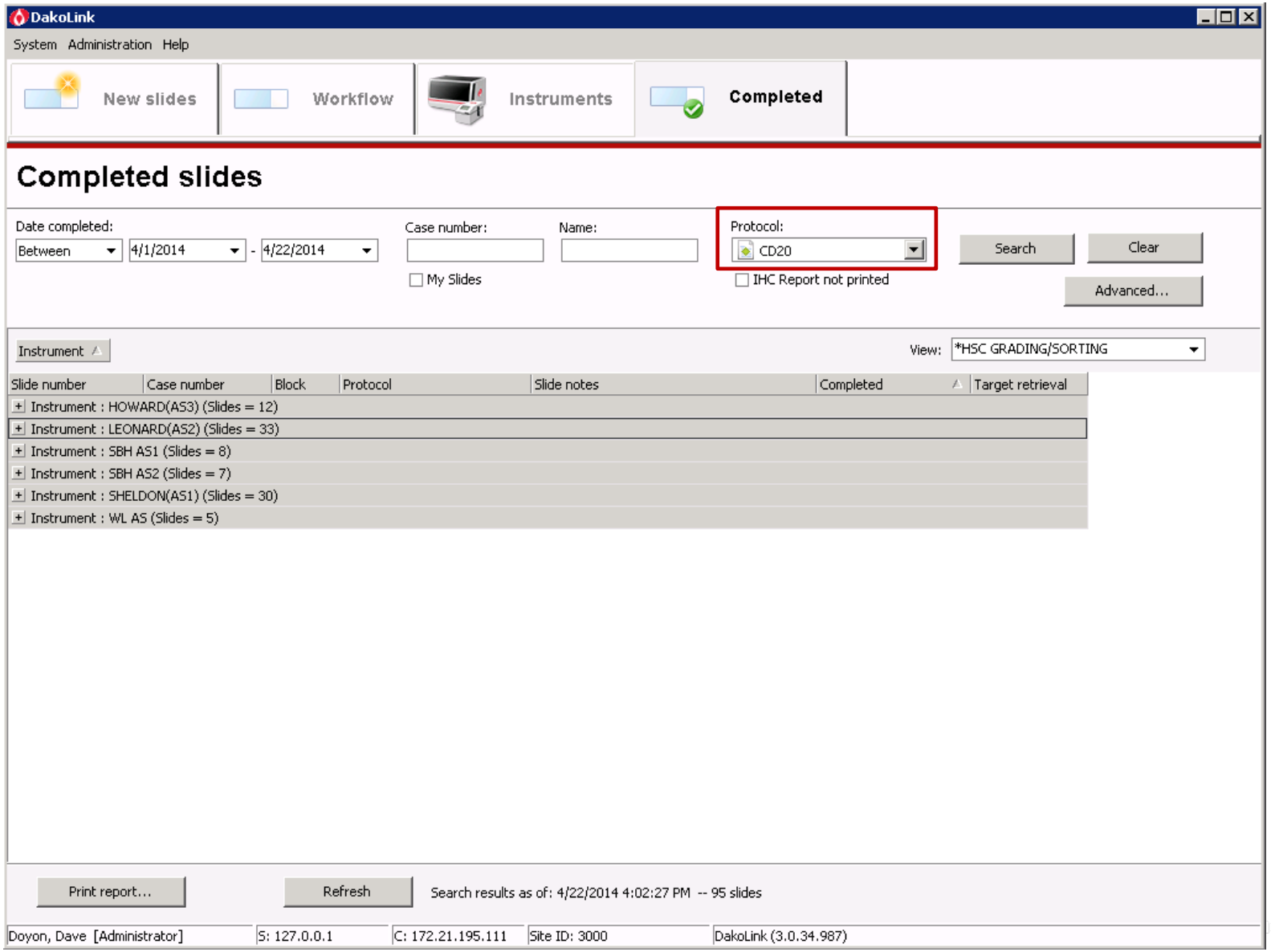

Reports: Easy data mining

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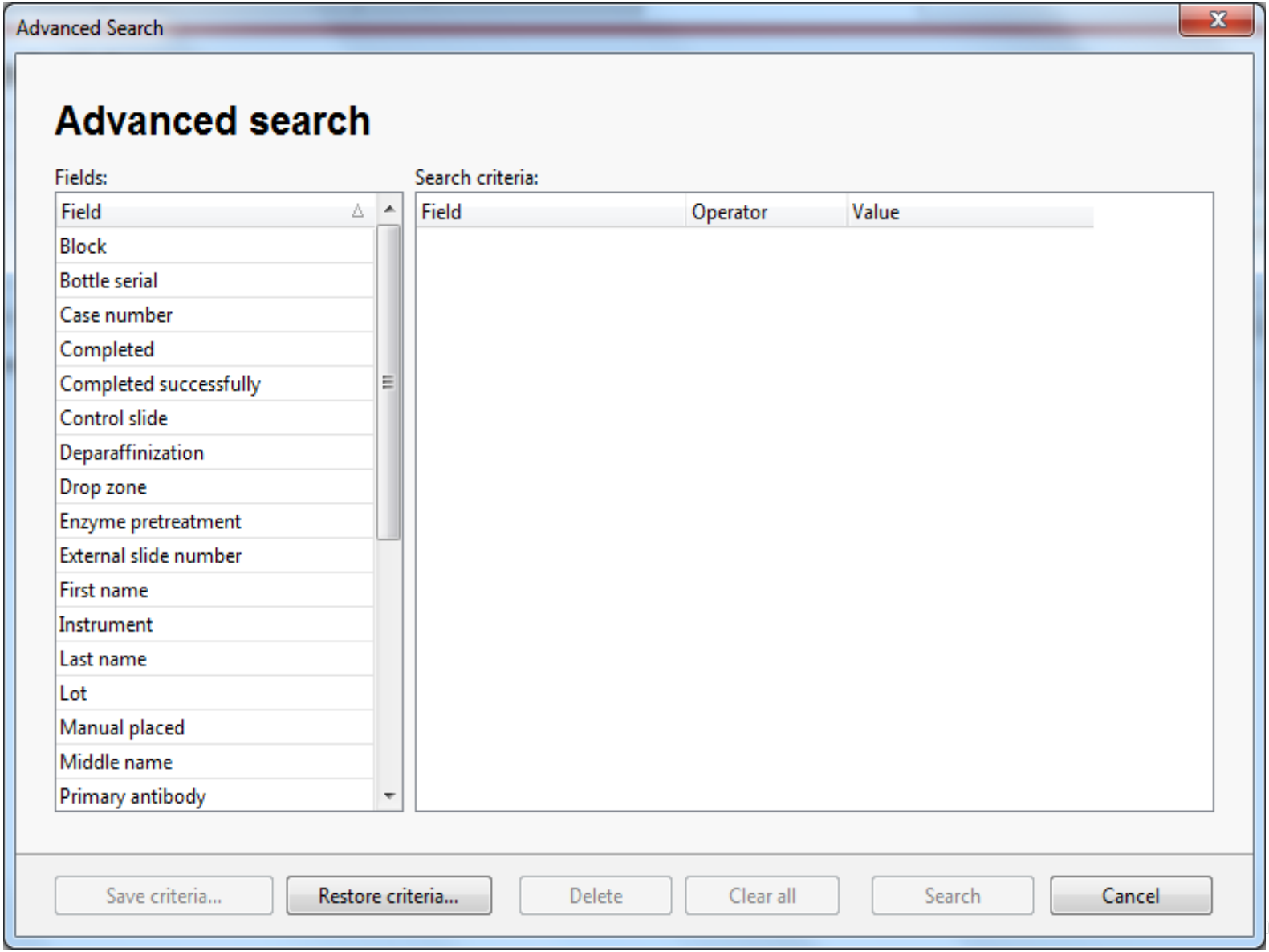

Reports: Monitor usage

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Slide Count by Protocol

Date from 1/1/2013 Date to 12/31/2013

Export to Excel

Primary antibody

Name	Description	Number of slides
AE1/3	FLEX Cytokeratin, MxH (AE1/AE3)	792
AFP	AFP, Rx	75
BCL-2	FLEX BCL2 Oncoprotein, MxH (124)	142
BCL-6		133
BSAP		168
CALC		8
CALRE		220
CD 34		149
CD10		237
CD138		141
CD21		5
CD21 10		2
CD21 30		2
CD23		80
CD3		2041
CD5		52
CD5 SP19		41
CD56		253
CD68		124
CDX-2		223
CEA-M		67
CHROM		258
CK5/6		309
CKIT		126
CYCD1	FLEX Cyclin D1, RxH (EP12)	14
Cyclin D1 10	Cyclin D1 10	2
Cyclin D1 20	Cyclin D1 20	2
Cyclin D1 30	Cyclin D1 30	2
CYT07	FLEX Cytokeratin 7 , MxH (OV-TL 12/30)	410
CYT20	FLEX Cytokeratin 20 , MxH (Ks20.8)	396
	Total slides for group	25229

- Easier to:
  - Find Root cause of staining issues
  - Troubleshooting with multi-lab perspective
  - Identify QC material
  - Understand tilization from 1 or multiple sites
  - Generate electronic reports for accreditations
  - Manage Inter-lab QC proficiency
  - Perform in-depth statistical data analysis

DSM LAN and WAN connectivity

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Wide Area Network (WAN) utilized applications at:

DIAGNOSTIC SERVICES MANITOBA

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- Standardization of staining
- Multi-site contingency: Instruments, reagents
- Track and trace: Slides status
- Reports: Easy data mining, monitor usage
- Remote access customer support: Software upgrades, troubleshooting

Future connectivity solutions at DSM

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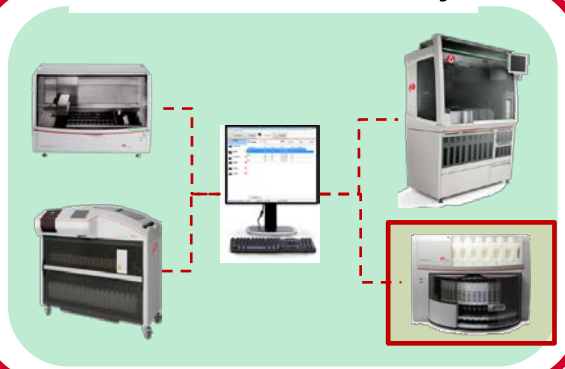
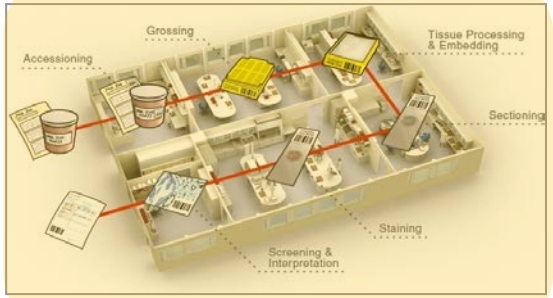
Instrument Connectivity

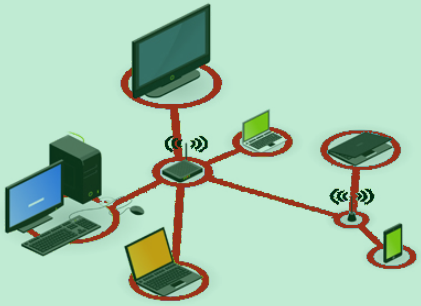


LIS Connectivity

Tracking connectivity



LAN Connectivity



WAN Connectivity

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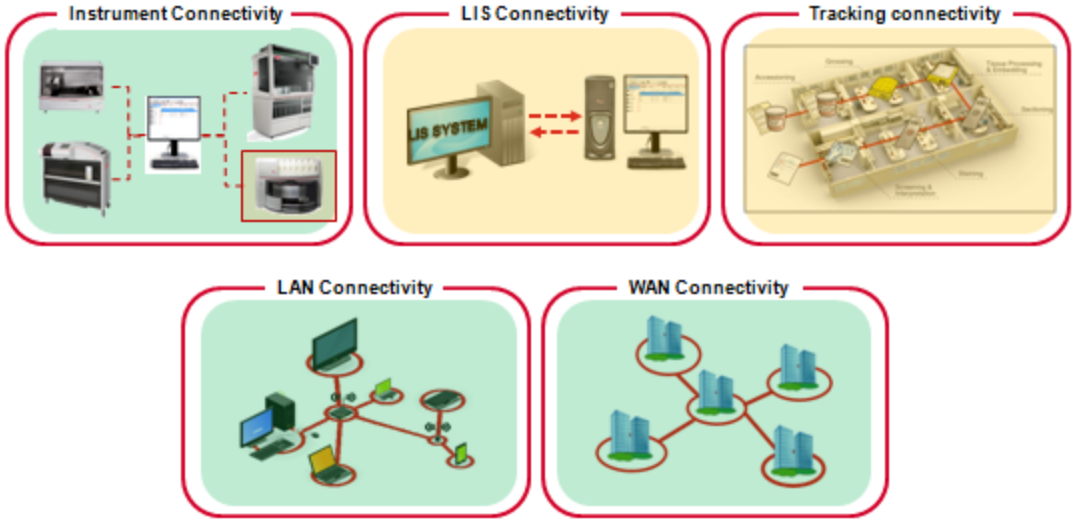
Future connectivity solutions at DSM



- Addition of special stains in IHC database
- LIS interface
  - Eliminate double entry = save time
- Tracking solution

Suggestions for implementation

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Decision Process

- Assess the level of tracking desired, define goals
- Check capabilities of current LIS system
- Does current LIS offer a tracking module?
- Does the module meet your goals?
  - If yes, implement
  - If no, seek other vendor middleware options
- Consider current internal IT capabilities before seeking outside help
  - Contract outside as needed

Suggestions for implementation

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Must Do

- Clearly identify the purpose and goals of the project
- Involve your IT department from the start
- Learn about the limitations of your existing systems
- Outline capabilities needed from outside organization
- Look at solutions from multiple vendors
  - Don’t assume that they all have the same capabilities
- Assign dedicated project manager
- Develop plan and implement in stages
  - Test system at key milestones
  - Catch and correct any problems early

Suggestions for implementation

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Pitfalls to Avoid

- Lack of clearly defined goals
- Assuming all tracking systems are the same
- Taking on a project that is too large – more than you need
- Not exploring compatibility of various systems, versions, etc.
- Involving IT department too late in the project
- Looking at connectivity as a side project
  - Lack of dedicated resource to manage

Summary of benefits - why connectivity?

- Eliminate manual data entry
- Reduce possibility of errors
- Maximize employee resources
- Track specimens and slides
- Manage workflow / workload
- Growth without increase in FTEs
- ***Better patient care!***

Discussion

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