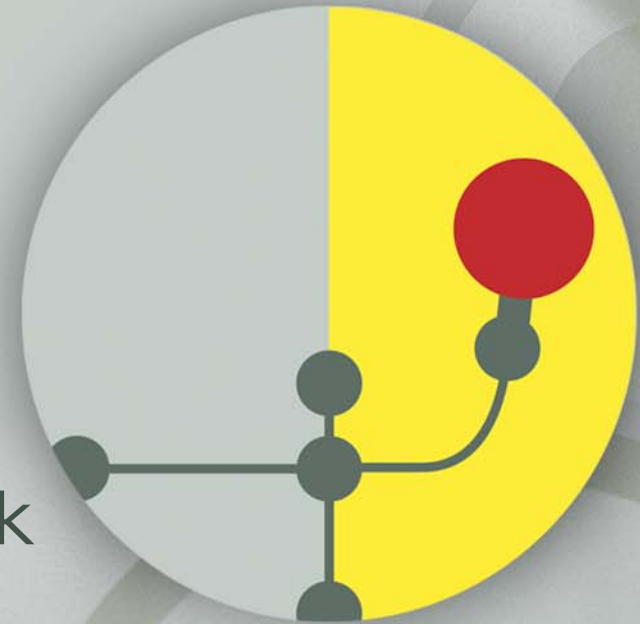


# Removing the Last Bottleneck To Automation



# Introducing EZ-MDF

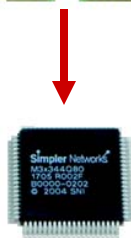


## EZ-MDF

- Removes the last bottleneck to automation of broadband services
- Provides automated testing and provisioning of all services over copper plant
- Ensures **Zero Touch Operations**



# Technology Breakthrough



**MEMS**

Micro Electro-Mechanical System

## Best Telecom Relay

- 200x smaller

## Uses Proven Manufacturing Techniques

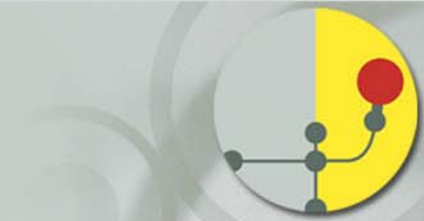
## Low Power Consumption

- **Latching**: retains its state in event of power loss

## Future Proof:

- Handles all frequencies/voltages for different telecom services

# EZ-MDF Benefits

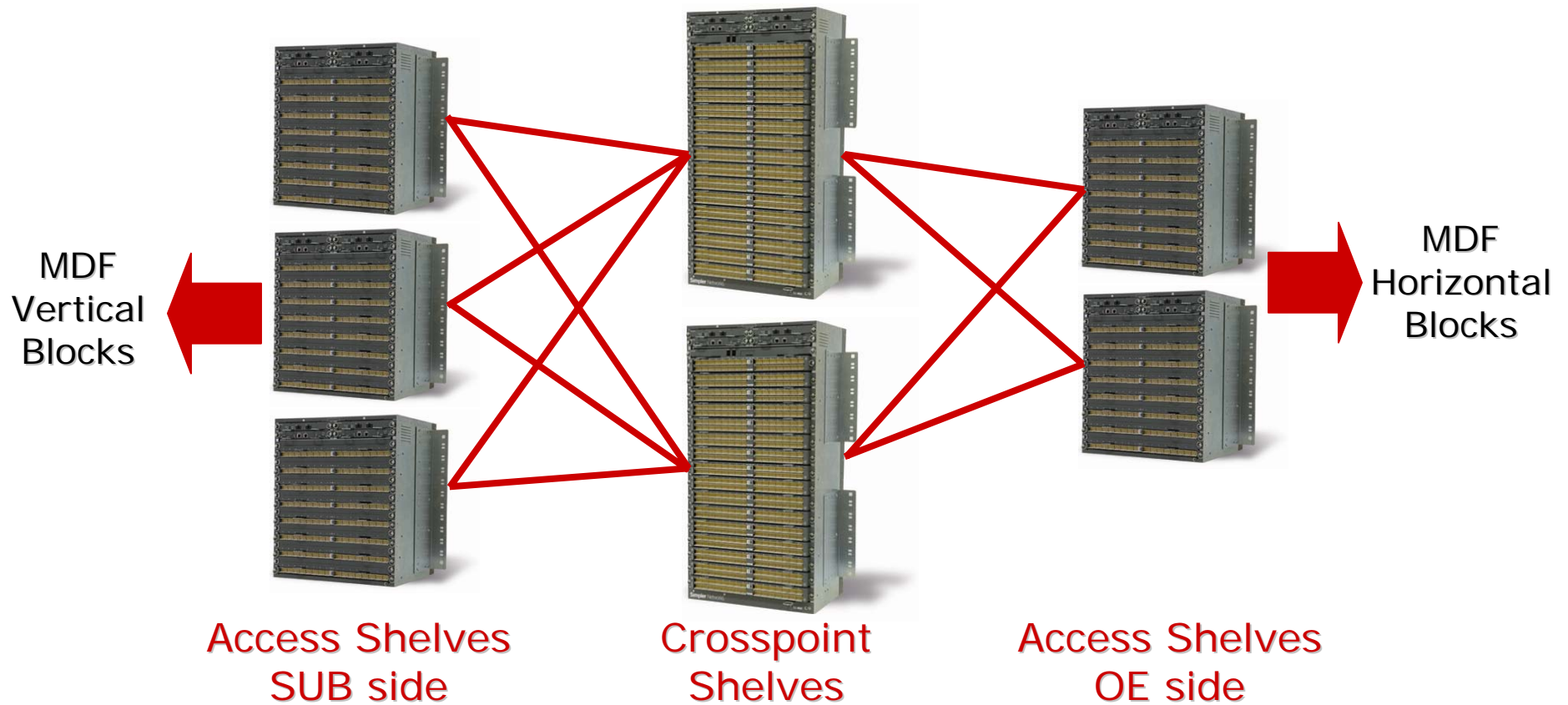


- Technology** Latching MEMS relays / Low Power consumption
- Scalability** 3,000 and up to 320,000 lines
- Architecture** Non-blocking via Unique CLOS architecture
- Reliability** In Service Maintenance
- Test Access** Integrated Test Access Matrix (TAM)
- Lights out Operations** Fast Cutover / CO Record alignment
  - Jumper filed autodiscovery
  - Flow through provisioning

# EZ-MDF Building Blocks



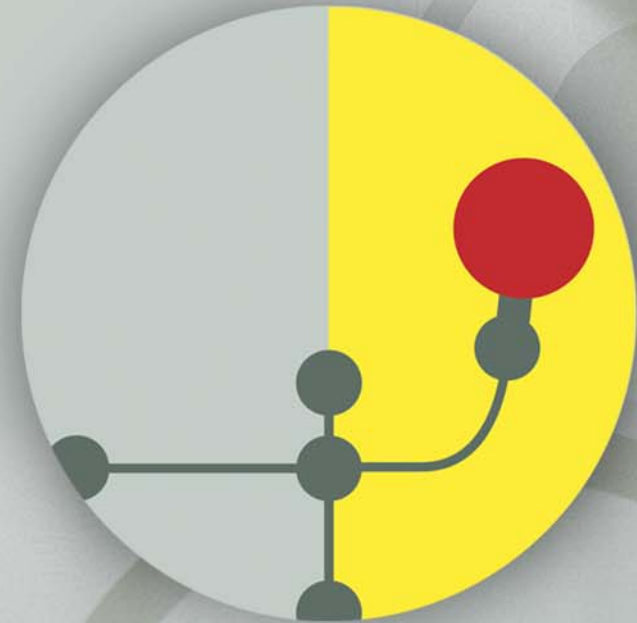
## Non-Blocking Any-to-Any Scalable Architecture



## Operator perspective

Should I be installing  
this technology?

Is there a business case  
to support?



# Evolution of Network and Activities



- Increasing Volume due to evolution
  - ILEC POTS to CLEC DSL with VoIP
  - UNE P to UNE Stand alone Loops (Hot cuts)
  - IDLC to UDLC (Hot cut – field/CO coordination)
  - Line Sharing (Vz Voice + CLEC DSL) to CLEC DSL + VoIP
  - CLEC to CLEC
  - ILEC (voice + DSL) to Naked DSL + VoIP
  - Technology change (One generation to next)
- Testing challenges
  - Broadband – provisioning & maintenance
- Retirements (Competition, Fiber and VOIP driven)
  - Copper, switch equipment

# Network Evolution & Activity – Sample 15,000 Line WC

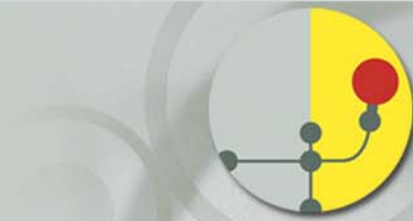


## MDF Utilization (15K office w/o FTTx)

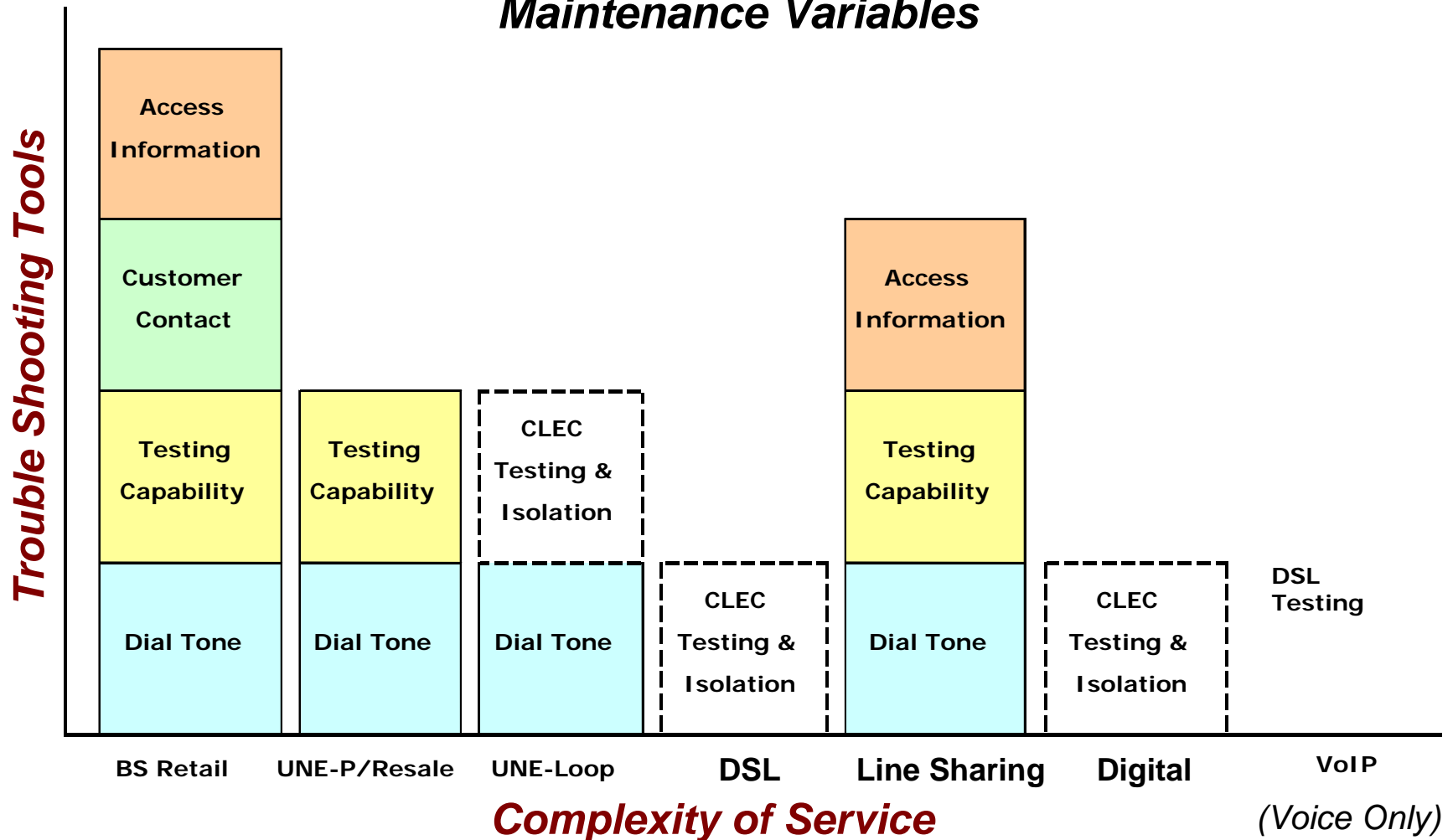
		2004	2009
<b>Wkg lines</b>	Total	15000	12000
	IDLC	4800	2475
	CLEC UNE-L/Loop Sharing	525	4825
	CLEC/ILEC Line Sharing	150	120
	UNE-P	1550	0
	ILEC DSL (V + D)	1275	0
	UILEC naked DSL (VoIP, etc.)	0	1600

		Utilization%	2004	Total Ports	2009
<b>Ports</b>	Lines MF Term/Ports		9675		4700
	CLEC MDF Frame Term/Ports in Use		400		4825
	ILEC+CLEC Lines/Ports in Use		10075		9525
	OSP Main Frame Term/Ports	60%		16792	
	CLEC Frame Term/Ports	50%		800	
	OE Ports in Use		9675		4700
	OE Ports Req.	93%		10403	
				27995	

# PMO Testing Scenarios



## Maintenance Variables



# 15,000 line Wire Center Avoidable Manual Maintenance Testing Expense



## Year 1 Test Volume Analysis

Testing Issues	Based on sample office 15K lines					
	CTRR	2004	Tests per trbl	Annual Volume		
				MLT	Manual	Wiring
		<b>Tribl Reports</b>				
CTRR (bs res/sm bus copper 2"FOC avg)	0.06	8650				
% code 3 (svc drop)	0.23	1990	4	7956		
% code 4 (OSP Cable)	0.31	2632	4	10726		
% code 5 (CO)	0.05	433	4	1730		
% code 7 (TOK)	0.15	1298	3	3893		
% code 8 (FOK in)	0.05	433	4	1730		
% code 9 (FOK out)	0.15	1298	4	5190		
Rewire to clear (1/4 code 4)	0.08	692				692
CPE (50% increment on CTRR for RBOC lines)	0.03	5211	2	10422		
CLEC CTRR (Assuming Parity)	0.06	378			378	
CLEC CPE (50% increment)	0.03	189	2	na	378	
TOK (50% higher than RBOC)	0.23	87	3	na	261	
Found Troubles (Comp to 3,4,5)	0.6	227	4	na	907	
Rewire to clear (1/4 code 4)	0.08	30				30
<b>Annual Total Tests</b>				4164	<b>1546</b>	722

## Year 5 Test Volume Analysis

Testing Issues	Based on sample office 15K lines					
	CTRR	2009	Tests per trbl	Annual Volume		
				MLT	Manual	Wiring
		<b>Tribl Reports</b>				
CTRR (bs res/sm bus copper 2"FOC avg)	0.06	4228				
% code 3 (svc drop)	0.23	986	4	3945		
% code 4 (OSP Cable)	0.31	1329	4	5317		
% code 5 (CO)	0.05	214	4	858		
% code 7 (TOK)	0.15	643	3	1930		
% code 8 (FOK in)	0.05	214	4	858		
% code 9 (FOK out)	0.15	643	4	2573		
Rewire to clear (1/4 code 4)	0.08	343				343
CPE (50% increment on CTRR for RBOC lines)	0.03	2583	2	5166		
CLEC CTRR (Assuming Parity)	0.06	3474			3474	
CLEC CPE (50% increment)	0.03	1737	2	na	3474	
TOK (50% higher than RBOC)	0.23	799	3	na	2397	
Found Troubles (Comp to 3,4,5)	0.6	1042	4	na	4169	
Rewire to clear (1/4 code 4)	0.08	278				278
<b>Annual Total Tests</b>				2064	<b>10040</b>	621

## Avoidable Manual Test Expenses

**Yr 1**  
(Approx. 1600 Tests @ \$20/test)  
**\$32,000**

**Yr 5**  
(Approx. 10000 Tests @ \$20/test)  
**\$200,000**

- + Avoid Manual Pre Installation Tests
- + Minimize Service Complaints, Service Penalty \$, Overtime \$

# EZ-MDF - Additional Impacts



## **TURN UP THE SERVICE** with QUALITY

- Service
  - **Hotcut volumes - no problem**
  - **Reduced over 24 hour troubles – double dispatch, repeaters. Worst wire centers get needed service fix**
  - **Service penalties: Retail & Wholesale minimized**
  - **PRE Test spare pairs and new xDSL – without MLT**

## **TURN OFF THE LIGHTS**

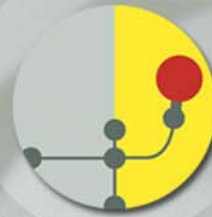
- Security
  - **Fewer technicians, security emps., vendors, cleaning crews**
  - **Work continues despite bomb threats, pickets, road closings**
- Cost
  - **Weekend or night coverage during bad weather eliminated**
  - **Eliminates hiring, training, overhead - to address peak work**

# Payback Analysis



Payback < 3.5 Years

TURN OFF THE LIGHTS



# Simpler Networks

## Thank you for your time!