



THE OHIO STATE UNIVERSITY

Information Technology Company Presentation

Presented by:

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Overview

- Very briefly recap your sector recommendation.
- Review what stocks we currently own in the portfolio.
- What stocks do you plan to buy/sell?



Securities Allocation			
Sector	S&P 500 Weight	SIM Weight	+/-
Information Technology	24.87%	24.25%	-0.62%
Financials	14.96%	14.69%	-0.27%
Health Care	13.82%	13.66%	-0.16%
Consumer Discretionary	12.75%	13.34%	0.59%
Consumer Staples	7.58%	7.93%	0.35%
Industrials	10.24%	10.38%	0.14%
Energy	5.61%	6.68%	1.07%
Utilities	2.72%	2.57%	-0.15%
Materials	2.95%	2.96%	0.01%
Telecommunication Services	1.88%	1.24%	-0.64%
Real Estate	2.62%	2.32%	-0.30%
Total	100.00%	100.00%	0.00%

Top 10 Holdings			
Ticker	Security	Mkt. Value	% of Assets
AMZN	AMAZON.COM INC	\$650,354	6.17%
WP	WORLDPAY INC	\$597,408	5.67%
CTSH	COGNIZANT TECHNOLOGY SOLUTIONS	\$574,140	5.45%
GOOGL	ALPHABET INC-CLA	\$562,999	5.34%
AAPL	APPLE INC	\$553,953	5.25%
GILD	GILEAD SCIENCES INC	\$539,301	5.12%
UAL	UNITED CONTINENTAL HOLDINGS IN	\$467,751	4.44%
GM	GENERAL MOTORS CO	\$458,821	4.35%
C	CITIGROUP INC	\$425,537	4.04%
WMT	WALMART INC	\$405,045	3.84%
Grand Total:		\$5,235,309	49.66%

Top 5 Performers	
APPLE INC	6.38%
COGNIZANT TECHNOLOGY SOLUTIONS	5.18%
AMAZON.COM INC	4.24%
WORLDPAY INC	1.21%
ARRIS INTERNATIONAL PLC	0.79%



- Based on the strong Free Cash Flows of the IT sector compared to other sector in the S&P 500 and the potential for innovation in this specific sector, we are recommending the board to :
 - Match the weight of the sector with the weight in the S&P 500
- Based on the relative valuation of each industries, we are recommending the board to:
 - Overweight Internet Software & Services
 - Underweight Software



Recommendations

Buy:

Sell:

Hold:

Stock	Current	Change	New
Alphabet	5.34%	-0.34%	5.00%
Apple	5.25%	-0.25%	5.00%
Arris	2.54%	1.71%	4.25%
Cognizant	5.45%	-0.45%	5.00%
World Pay	5.67%	-0.67%	5.00%



Worldpay

- Driven by growth and adoption of electronic payments by everyday individuals and businesses
- Cyclical
 - Sensitive to the economy
- Able to provide services across the entire payments processing value chain
 - Merchant Services to Financial Institutions
- International presence
 - U.S. & U.K.

Google



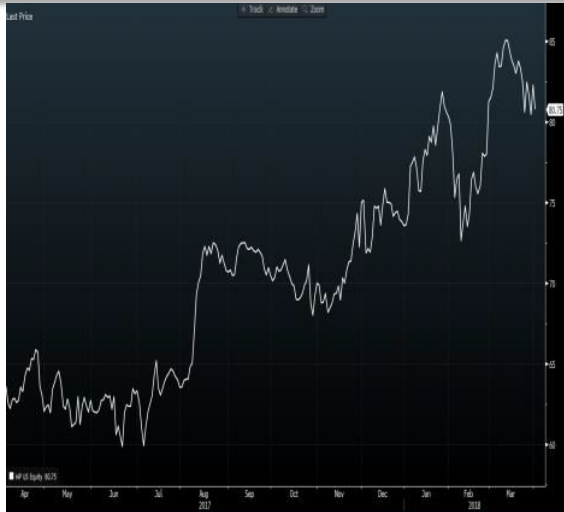
Financial Analysis

You may want to review your projections for earnings and sales for the companies and compare/contrast them

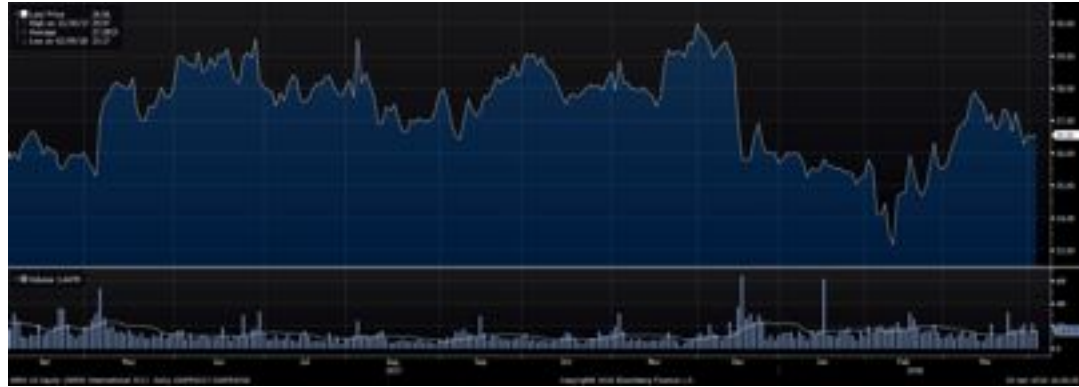
- o Review the breakdown of ROE for the companies—compare/contrast the companies
- o Discuss other profitability, growth, credit and activity ratios, if deemed important.
- o Review the history of the companies and compare/contrast it with the current and future projections—will the environment improve, deteriorate, stay the same? Why?



Worldpay



ARRIS International





	Worldpay	Google	Arris	Cognizant
Current Price	\$82.24		\$26.50	
Revenue (2017)	\$4.026 B		\$4.767 B	
Revenue Growth	13%		-3.14%	
ROE	14.08%			

- Discussion points about the table



Worldpay

- Historically Worldpay had revenue growth with a range from 13% to 23%.
 - Aggressive growth with Merchant Services Segment [16%, 28%]
 - Lagging growth with Financial Institutions Segment [-7%, 5%]
- Future growth appears to be optimistic with the recent acquisition
 - International presence
 - New clients
 - R&D technology development
- Risk with economic/ political conditions in U.S. and international markets



ARRIS International Plc.

Business Segment	Lines of Businesses within	Market Share	Addressable Market Size	Annual Growth
CPE	<ul style="list-style-type: none"> -Video -Set-top -Video Gateway -Broadband -DSL and Cable Modems -Broadband Gateway 	<ul style="list-style-type: none"> -Nationally=34% -Internationally=14% 	\$20.5B	<ul style="list-style-type: none"> -Video = -0.8% -Broadband= 4%
Network and Cloud	<ul style="list-style-type: none"> -Networks -CMTS/CCAP/PON -Video Systems -Access Technologies -Software and Services -Software -Global Services 	-N/A	\$7.8B	-4% to 7%
Enterprise Network	<ul style="list-style-type: none"> -Enterprise Channel -Campus Network Switches -WiFi Access Points - Smart Wireless and Software -Services -Systems Management Control 	-Globally= 6%	\$14.4B	-9% to 10%

Ticker	ARRS
Current SIM %	2.54%
Recommended SIM %	4.25%
Current Price	\$26.50
Target Price	\$42.21
Potential Upside	37.22%



ARRIS International Plc.

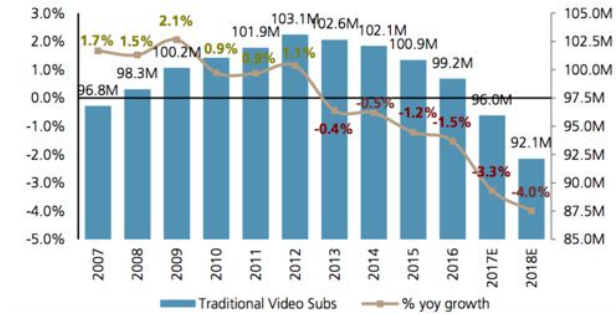
- Fundamental drivers:
 - Introduction of CBRS to the Commercial Industry
 - Tailoring of CPE to geographic location
 - Focus on N&C and Enterprise Networks



Tailoring of CPE to Geographic Location

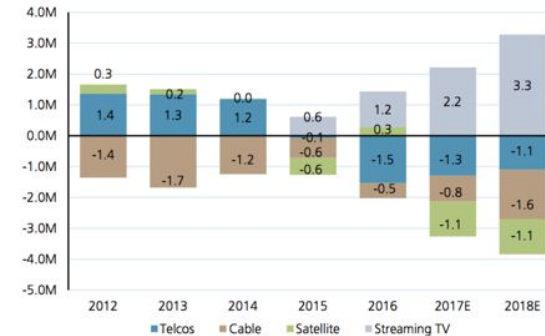
	2017	2016	Change
Domestic US	65.79%	71.89%	-6.10%
Americas excluding US	16.33%	14.39%	1.94%
Asia Pacific	5.67%	4.27%	1.40%
EMEA	12.21%	9.45%	2.76%
Total International	34.21%	28.11%	6.10%
Total Sales	100.00%	100.00%	

Figure 7: Traditional video subscribers



Source: Company data, UBS estimates

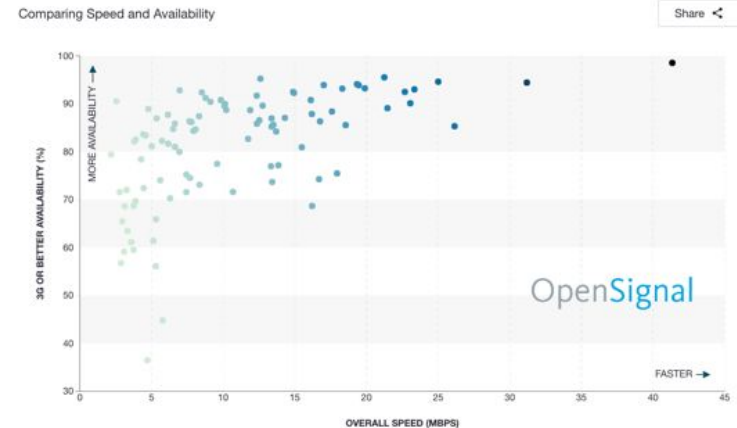
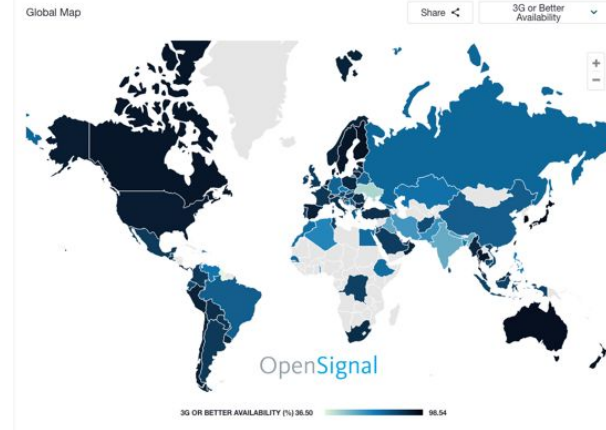
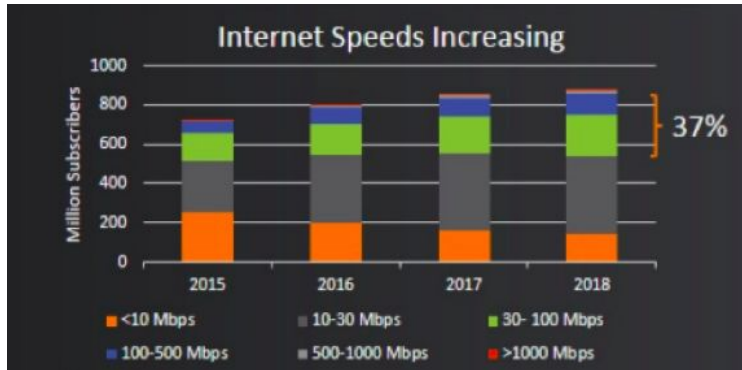
Figure 8: Pay TV net additions by provider



Source: Company data, UBS estimates



Focus on N&C and Enterprise Networks





Financial Analysis - Historical and Future Analysis

ARRIS International:

- Revenue decrease by 3.1% while Gross margins improved by 0.20%
 - Focus on increased sales in N&C and Enterprise Network sectors
 - Will support this through the increase in Research and Development
- Low multiples compared to industry average and peers
- Multiples are still below historical highs but above historical medians

Percent of Total Sales by Business Segment					
Business Segment	2013	2014	2015	2016	2017
CPE	67.62%	69.33%	65.37%	69.52%	67.67%
N&C	32.95%	30.76%	34.63%	30.92%	31.66%
Enterprise	0.00%	0.00%	0.00%	0.00%	0.69%
Other	-0.57%	-0.10%	0.00%	-0.44%	-0.02%
Total	100.00%	100.00%	100.00%	100.00%	100.00%

ARRIS International Plc. Income Statement:

ARRIS International (ARRS)					
Analyst: Madeline Masayk					
3/27/2018					
	FY	FY	FY	FY	FY
(000\$)	2020	2019	2018	2017	2016
Consensus	7,380,000.00	7,330,000.00	7,260,000.00		
Net Sales	7,547,600.03	7,292,367.18	6,945,111.60	6,614,392.00	6,829,118.00
Costs of Sales	5,434,272.02	5,250,504.37	5,069,931.47	4,948,153.00	5,121,501.00
Gross Margin	2,113,328.01	2,041,862.81	1,875,180.13	1,666,239.00	1,707,617.00
Operating Expenses					
Selling, general, and administrative expenses	490,594.00	474,003.87	451,432.25	475,369.00	454,190.00
Research and development expenses	717,022.00	692,774.88	659,785.60	539,094.00	584,909.00
Amortization of intangible assets	339,642.00	328,156.52	312,530.02	375,407.00	397,464.00
Integration, acquisition, restructuring, and other costs	75,476.00	72,923.67	69,451.12	98,357.00	160,337.00
Impairment of goodwill and intangible assets				55,000.00	2,200.00
Total operating expenses	1,622,734.01	1,567,858.94	1,493,198.99	1,543,227.00	1,599,100.00
Operating Income	490,594.00	474,003.87	381,981.14	123,012.00	108,517.00
Other expense					
Interest expense	88,306.92	85,320.70	81,257.81	87,088.00	79,817.00
Loss on investment	11,321.40	10,938.55	10,417.67	11,066.00	21,194.00
(Gain) loss on foreign currency	(3,773.80)	(3,646.18)	(3,472.56)	9,757.00	(13,982.00)
Interest income	(3,773.80)	(3,646.18)	(3,472.56)	(7,975.00)	(4,395.00)
Other expense (income), net	3,773.80	3,646.18	3,472.56	1,873.00	3,991.00
Income before Income taxes	394,739.48	381,390.80	293,778.22	21,203.00	21,892.00
Income tax expense (benefit)	78,947.90	76,278.16	58,755.64	(44,921.00)	15,313.00
Consolidated net income	315,791.59	305,112.64	235,022.58	66,124.00	6,579.00
Net loss attributable to noncontrolling interest	-	-	-	(25,903.00)	(9,139.00)
Net income attributable to ARRIS International plc.	315,791.59	305,112.64	235,022.58	92,027.00	15,718.00
Net income per common share					
Basic	1.69	1.63	1.26	0.49	0.08
Diluted	1.67	1.61	1.24	0.49	0.08
Consensus- GAAP	1.25	1.23	0.90		



ARRIS International Plc vs. Competitors:

Ticker	P/E TTM	P/S TTM	P/B	P/CF TTM	EV/ EBITDA TTM
Average	25.43	1.97	2.44	12.46	12.42
ARRIS International	22.67	0.68	1.55	9.38	8.76
Peers					
Ubiquiti Network	21.61	5.14	11.22	26.98	16.32
Calamp Corp	108.87	2.23	4.05	12.44	20.84
Adtran Inc	22.95	1.20	1.51	N/A	12.62
Netscout System	65.11	2.26	0.99	9.68	10.57
Commscope Holdings	36.53	1.61	4.63	13.09	12.23

ARRIS International Plc Historical vs. Current Multiples

Absolute Basis	High	Low	Median	Current
P/E	24.61	14.06	19.14	23.0558
P/B	5.75	2.80	3.89	5.382
P/S	4.55	2.14	3.24	4.2631
P/EBITDA	16.25	9.75	11.99	15.2164
EV/EBITDA	15.40	8.45	10.91	14.0644

ARRIS All Products Global Addressable Market			
Business Segment	2017	2018	2021
Network and Cloud	\$7.9B	\$8.4B	\$10.3B
CPE	\$20.5B	\$21.4B	\$22.9B
Enterprise	\$14.4B	\$15.4B	\$18.4B
Total	\$42.9B	\$45.3B	\$51.5B





Valuation

- o Determine a target price for all names held within the sector and compare the potential price appreciation.
- o Include the DCF's for your companies (either in the presentation or in the appendix to the presentation).
- o Review the valuations in light of historical price ratios—have the ratios expanded/contracted/stayed the same over the years?
- o Review the valuations relative to the industry, sector (if available), and S&P 500—have the ratios expanded/contracted/stayed the same over the years?
- o Review your expectations for future valuations—will the ratios expand/contract/stay the same going forward?
- o Review the results of technical analysis



	Worldpay	Google	Arris	Cognizant
Current Price	\$82.24		\$26.50	
Target Price	\$122.95		\$42.21	
Upside	49.5%		37.22%	
P/E	20.61		22.67	
P/S	3.23		0.68	
P/B	26.97		1.55	
P/FCF	19.33		9.38	
EV/EBITDA	17.49		8.76	



Worldpay	2016	2015	2014	2013	2012
Price	\$59.62	\$47.42	\$33.92	\$32.61	\$20.42
P/E	22.11	21.31	18.207	21.07	17.39
P/S	5.66	5.00	3.93	4.93	3.77
P/B	8.89	9.49	7.08	8.09	3.55
P/FCF	17.65	10.22	9.83	10.80	9.82
EV/EBITDA	14.98	13.78	12.37	12.81	10.68



S&P 500	2017	2016	2015	2014	2013	2012
P/E	19.95	18.88	17.38	17.20	16.71	13.75
P/S	2.16	1.93	1.80	1.76	1.64	1.29
P/B	3.26	2.93	2.76	2.82	2.57	2.13
P/FCF	23.49	20.12	17.87	18.70	14.33	14.79

Info Tech Sector	2017	2016	2015	2014	2013	2012
P/E	19.08	17.41	16.98	16.71	15.76	12.52
P/S	4.25	3.54	3.32	3.21	2.93	2.21
P/B	5.58	4.23	4.12	4.07	3.68	3.13
P/FCF	20.76	16.96	16.52	15.67	15.04	12.28





Present your recommendation.

- o Your recommendation should be in basis points (buy/sell).
- o Mention the primary catalysts (that support your recommendation) for each stock (e.g. valuation, improved prospects, etc).
- o Talk about the primary risks to your recommendation for each stock.
- o State the price targets for all stocks owned within your sector. Also, include target prices for buy-recommended stocks and explain your rationale.





Worldpay DCF

Vantiv/ WorldPay

Analyst: Prabha Pelluru

3/31/18

(000s)

Terminal Discount Rate = 10.0%

Terminal FCF Growth = 5.0%

Year	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E
Revenue	4,630,449	5,232,407	5,912,620	6,503,882	7,024,192	7,586,128	8,193,018	8,602,669	9,032,802	9,484,442	9,958,664
% Growth		13.0%	13.0%	10.0%	8.0%	8.0%	8.0%	5.0%	5.0%	5.0%	5.0%
Operating Income	2,454,138	3,087,120	3,488,446	3,837,290	4,144,273	4,475,815	4,833,881	5,075,575	5,329,353	5,595,821	5,875,612
Operating Margin	53.0%	59.0%	59.0%	59.0%	59.0%	59.0%	59.0%	59.0%	59.0%	59.0%	59.0%
Interest Income	(908,031)	(1,142,234)	(1,290,725)	(1,417,846)	(1,531,274)	(1,653,776)	(1,786,078)	(1,875,382)	(1,969,151)	(2,067,608)	(2,170,989)
Interest % of Sales	19.6%	21.8%	21.8%	21.8%	21.8%	21.8%	21.8%	21.8%	21.8%	21.8%	21.8%
Taxes	324,682	408,426	461,521	508,083	548,730	592,628	640,039	672,040	705,643	740,925	777,971
Tax Rate	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%
Net Income	1,221,424	1,536,460	1,736,199	1,911,361	2,064,270	2,229,411	2,407,764	2,528,152	2,654,560	2,787,288	2,926,652
% Growth		25.8%	13.0%	10.1%	8.0%	8.0%	8.0%	5.0%	5.0%	5.0%	5.0%
Add Depreciation/Amort	370,436	418,593	473,010	520,311	561,935	531,029	573,511	516,160	541,968	474,222	497,933
% of Sales	8.0%	8.0%	8.0%	8.0%	8.0%	7.0%	7.0%	6.0%	6.0%	5.0%	5.0%
Plus/(minus) Changes WC	(192,637)	(72,235)	(81,626)	(78,047)	(84,290)	(91,034)	(98,316)	(103,232)	(108,394)	(113,813)	(119,504)
% of Sales	-4.2%	-1.4%	-1.4%	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%
Subtract Cap Ex	(277,827)	(261,620)	(295,631)	(292,675)	(316,089)	(341,376)	(368,686)	(387,120)	(406,476)	(426,800)	(448,140)
Capex % of sales	-6.0%	-5.0%	-5.0%	-4.5%	-4.5%	-4.5%	-4.5%	-4.5%	-4.5%	-4.5%	-4.5%
Free Cash Flow	1,121,396	1,621,197	1,831,952	2,060,950	2,225,826	2,328,031	2,514,273	2,553,960	2,681,658	2,720,897	2,856,942
% Growth		44.6%	13.0%	12.5%	8.0%	4.6%	8.0%	1.6%	5.0%	1.5%	5.0%

Valuation		
NPV of Cash Flows	13,738,282	37%
NPV of terminal value	23,130,968	63%
Projected Equity Value	36,869,250	100%
Free Cash Flow Yield	4.55%	
Current Price	\$82.24	
Implied equity value/share	\$ 122.95	
Upside/(Downside) to DCF	49.5%	