Save your money. Save the planet.

Introduction of COOLING RACK

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Problems of traditional ROOM unit cooling system





Computer Room Air Conditioner malfunction critically affects to whole system (forcing to set a Backup CRAC)



Direct Cooling Architecture

COOLING RACK

Small-sized independent data center with constant temperature, soundproof, dustproof, powersaving and monitoring functions, for which cooling can be focused only on IT equipment as being separated from the external influences (dust, humidity and temperature) By adding cooling system into a standard rack and sealing the internal up.

Micro Data Center



More info

Benefit







COOLING RACK Product Group



Variable products for place, environment, Rack unit or cooling capacity.



Competitor



- All in one with client's NEEDS
- St has its own technology developed from hardware to software.

Manufacturer		DOBE Computing	А	E	R	
Uninterruptab	le system (high availability)	Selectable				Unique. Our own technology
Physical securi	ty (Access Control)	ОК				onique, our own technology
Heat Exchange	er capacity	5,000 BTU ~ 10,000 BTU				WORLD LEADING TECHNOLOGY
Air Conditioner capacity		7,000 BTU ~ 60,000 BTU	14,000 BTU	12,000 BTU	10,000 BTU	Compact, High Capacity
List price		US\$ 10K ~	US\$ 12K	US\$ 20K	US\$ 25K	High price competitiveness
Sealed (soundp	proof, dustproof)	ОК	ОК	ОК	Selectable	
Over-heating-proof		ОК	ОК	ОК		
Standalone (wi	thout outdoor Unit)	Selectable	ОК	ОК		
Hot Swappable	2	ОК		ОК	ОК	
Duct		Selectable	Selectable			
Rack Unit		18U ~ 84U	27U	29U	Selectable	
	Smartphone	ОК		ОК	Selectable	
	Short Message service	ОК	ОК		Selectable	
wonitoring	Web Browser	ОК		ОК	Selectable	
	API	ОК		ОК	Selectable	

Reference - Military







- XXXXXXX control system
- Model : User-defined Model •
- Outdoor cabinet & Vehicle on board
- Waterproof and bulletproof
- Redundant vibration prevention
- Triple air-conditioning system
- One heating system





Republic of Korea Air Force

- Mobile Command Center ٠
- Model : User-defined Model ٠
- Option : rapid exhaust against overheating





Reference - Military







- XXXXXXX communication System
- Model : User-defined Model
- Option : rapid exhaust against overheating
- Requirements
- Korean Navy dispatch to Gulf of Aden
- Aden's operational environment is very hot
- number of military secrets





Xth Fighter Wing

- XXXX Warning System •
- Model : Entry (User-defined Model) •
- Option : rapid exhaust against overheating

Double access restriction device



Reference - Government







- Purpose : Non-stop tolling System
- Application Models : Quiet Office & Entry
- Characteristic
 - Downtime = " 0 "
 - Cooling unit & Controller redundancy
 - Monitoring + Remote Control





KOREA HYDRO & NUCLEAR POWER

- KORI Nuclear Power Plant
- **Purpose : XXXXXXXX** monitoring telemetry system
- Application Models : Entry
- Characteristic
 - Downtime = " 0 "
 - Environmental monitoring of nuclear leaks, etc.
 - Redundancy of COOLING RACK

Reference – Finance





IBK SAVING BANK

- Purpose : Establishing a communication system
- Application Models : Entry
- Characteristic
 - Downtime = " 0 "
 - Mobile Monitoring



HF KOREA HOUSING FINANCE CORPORATION

- Purpose : Environmental radiation monitoring telemetry system
- Application Models :
 - Entry
- Characteristic
 - Downtime = " 0 "
 - Environmental monitoring of nuclear leaks, etc.
 - Redundancy of COOLING RACK

Reference – Government LAB & University















Smart Rack





- Smart Rack = Cooling Rack EDGE Model + Anti-vibration
- Purpose : To protect the nation's major computer systems from earthquakes.
- Characteristic
 - 1. World's First Anvi-vibration Integral
 - 2. be easy to install
 - 3. be convenient to move
 - 4. It can be monitored on a rack basis
 - 5. The cooling unit can be selected
- Specification
 - 1. earthquake magnitude 7.0 or higher
 - 2. Vibration displacement: 150mm or less
 - 3. Seismic Isolation Self-Load: 3,000 kg or more
 - 4. Obtained the Certificate of the International Accreditation Laboratory





Testing by the International Laboratory for Accreditation





Save your money. Save the planet.



TCO (COOLING RACK vs Data Center 165 m)







Cunstruction = Space(3,3m² per \$41,6) = Cooling (5yrs) = Cooling Maintenance(4yrs) = Move, Demolition, etc. = Occupying space(5yrs)

🗟 More info

COOLING RACK vs Computer Room (build & space cost)









Step	Contents	Costs (US\$)	days
1	Minimal area - 16.5 m²	Extra	0
2	Waterproof/floor construction	17 5 4 4	3
3	Power/Access control system	- 17,544 -	2
4	28,000 BTU(3RT) HVAC	5,482	1
5	Rack and Monitoring Solution	5.263	2
	TOTAL	\$28,289	8

Step	Contents	Costs (US\$)	days
1	Minimal area - 5 m ²	Extra	0
2	Entry Model (36,000 BTU) * 2	2X,544	0.1



COOLING RACK vs HVAC on Power Consumption





* In case of building system with 25,000 BTU of server heat value

연간 절감효과								uni	t : Kwh / US\$
Reduce power vs HVAC		HVA (Power 1	C 3RT .3.8 Kwh)		Comparison	Er	Coolin htry * <mark>2</mark> (Po	g Rack wer 3.4 Kv	vh)
700/		27,63	8 BTU		Cooling capacity		36,00 (20,000 BTU p	0 BTU ber each Entry)
/9%	3~5	6~8	9~10	11~2	Season (Month)	3~5	6~8	9~10	11~2
	12	24	11	2.7	Temperature, avg. (°C)	12	24	11	2.7
A Daduce CO2	65.2	105.7	65.2	92.5	Electricity Cost	65.2	105.7	65.2	92.5
C Reduce CO2	100%		AC load (%)	100%					
		13.8	Kwh		Power Consumption		3.4	Kwh	
40 ton	US\$ 8,948			Annual Cost	US\$ 2,204				
		US\$ 8	8,948		Converted Cost (86%) Based on Cooling Capacity		US\$	1,895	
		Ba	used on the cos	t of General Se	rvice(A) low-voltage on Nov.21. 2013.	(Excluding spe	cial conditions)		

Calculation above is a simple comparison and can vary with contract condition, installation environment, etc.

The above results are based on South KOREA (Exchange Rate : \1,140)



COOLING RACK and DATA CENTER case studies



Based on 100 computer equipment including server, storage, network, backup device

(2,500 BTU per equipment / Total calorific value 250,000 BTU)



unit : Kwh / US\$

Data Cente	r	Contents	Cooling Rack – Quie	t Office Model (30,000 BTU)
 18 equipment per Rack 6 racks required (108 = 18 * 6) US \$5,310 		Rack	 12 equipment per Rack 9 racks required (Quiet O 	ffice Model / 108 = 12 * 9) 5 \$119,363
79.3 m ²		Space		99.1 m ²
US \$84,880	,	Infrastructure construction	ι	JS \$4,420
US \$61,892 – with Bac	ckup device	HVAC	US \$14,146 -	- with backup device
	Access control		Access control	
US \$7,957	Monitoring for rack	Addition device	Monitoring for rack	Include detault
US \$160,03	5	Build cost	Us	^{5 \$137,931} 60%
HVAC	US \$66,384	Yearly cooling costs	US \$26,358	4.5Kv * 9 = 40.5 Kw
US \$316,00	7	5 years cooling cost	US	\$\$131,972 Reduce
1 addition rack & Additional	HVAC deployment	Adding 24 equipment's	Simply add two r	nore Quiet Office models
27%		Failure rate due to environmental factors	Less	then 0.001%
Complex		Transfer or demolition		Easy







D Go back



Monitoring of COOLING RACK





Earthquake-related – ARAB NEWS





Is Riyadh a safe place from earthquakes?



JEDDAH: Earthquake monitoring stations belonging to the Saudi Geological Survey (SGS) have detected 7,172 earthquakes during 2018 in the region.

SGS spokesperson, Tariq Abaakhel listed the areas where earthquakes have been recorded throughout the year.

Among those areas was Harrat Al-Shaqa, a lava field in northwestern Saudi Arabia, which has witnessed 3,027 earthquakes, with a magnitude of 2.7 on the Richter scale.

Saudi Arabia seismic activity in a small village in Al-Ihsa, in Haradh region, reached 1,316 earthquakes, with a magnitude of 3.5 on the Richter scale.

In the Kingdom's northern Red Sea region, 1,066 earthquakes were detected with a magnitude of 2.9 on the Richter scale. While the southern Red Sea region recorded 32 earthquakes with a magnitude of 2.9.

Along the Gulf of Aqaba, 376 earthquakes were detected with an average of 3.3 magnitude.







Patent



상표·서비스표등록증

CERTIFICATE OF TRADE / SERVICE

등록 제 45-0063459 호 Nepistudes Farew

문동법은 제 45-2015-0001772 호 유명하다 Norter 유명하다 Norter 2015년 02월 27일 호락을 2016년 03월 14일 Reproductions

상류시비스토공자 Coast of the foliations that th 주식회사 무비컴퓨팅(134511-******) 전기도 용인시 체인구 동부로 41 (마평등)

실원(시비스뢰)를 사용할 상렬(시비스입장) 및 구분

위의 표장은 『상표법』에 따라 상표·서비스표등특원부에 등록되었음을 중명합니다.

2016년 03월 14일

This is to certify that, in accordance with the Trademark Act, a trade/service mark has been registered at the Korean Intellectual Property Office.

특허청장 COMMESSIONER KOREAN INTELLECTUAL PROPER

Cooling Tack

제 09 유 등 2 개류 평풍지택동 39건

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명국과 199810여 여성군(702027-1*****) 경기도 분산지 위단구 이동면 생거동도700년년 28, 세광편비적 다북 105동 1701도

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등록 제 45-0063461 호

유도원은 제 45-2015-0001775 호 유명은 2015년 02월 27일 공학 전자 등록날 2016년 03월 14일 전망가파 제품

주식회사 두비컴퓨팅(134511-******) 경기도 용인시 처인구 동부르 61 (미평풍)

상고(사세스교)을 시용할 상황(세비스일)) 및 구성 (HH Sealestation) 제 09 류 등 2 개류 컴퓨터팩은 39건

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특허청장

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방영화 generation 비생절(701077-1*****) 평가도 운영지 지난구 이동면 전기중식703위월 28, 제출권위시 가격 100분 779도

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991	2014년 10월 27일	
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2019 :==== 타성균(701027.=====) 경기도 용인시 처인구 이동면 왕기동료 705면질 28, 303등 1304요(세공면리치타워

상표·서비스표등록증

제 45-2015-0001773 호

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특허청장

ServerFridge

등록 제 45-0063460 호 Registration Tamber

신유 전비스프공지 Own of the Tableson Hill Hy 주시회사 무비행유행(134511.*******) 평기도 용인시 저인구 동부로 61 (다명동)

양고(시셔스프)를 시용할 상동(세비스럽린) 및 구준 (Tri d Sock and Service 제 69 류 등 2 개류 전류비역용 64건

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